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ABSTRACT

This magazine is published for classroom innovators. The content of this issue includes: (1) "Who's the Learner in Learner-Centered?" (Gay Gordon); (2) "The Product of a Perfect Partnership" (Tracy Crow); (3) "E-Learning Potential" (Joan Richardson); (4) "A Review of 'Evaluating Professional Development'" (Gay Gordon); (5) "Dreaming All That We Might Realize" (Dennis Sparks); (6) "Taking on Loneliness" (Rick DuFour); (7) "Learning To Use Data to Get Results" (Pat Barron, Cathy Behrends, and Jennifer Feeney); (8) "Even Better Than Face-to-Face?" (Judy Spicer); (9) "Creating Happy Memories" (Denise Jarrett Weeks); (10) "Just Because It's Online Doesn't Mean It's Learner-Centered!" (Ann-Claire Anderson); (11) "Home-Grown Professional Learning" (Ronald Havlice); (12) "Writing for Professional Journals" (Pamela Galus); (13) "Exploring the Unknown--Together" (Marianne B. Barnes, Patty Crews, Rosanne Curry, and Jackie Simms); (14) "Online Professional Development To Support Curriculum Implementation" (Wendy Gulley, Paul Hickman, and Stephanie Feger); (15) "Developing Professional Developers" (Margaret Bondorew and Kathleen S. Coleman); (16) "Teachers Becoming Self-Directed Learners: A Work in Progress" (Jane Horwitz and Bonnie Hallam); (17) "The Glenn Commission and Professional Development" (Paul Kimmelman); (18) "From a Science Teacher's Perspective: Working with Scientists Makes All the Difference" (Jan L. French); (19) "From a Math Teacher's Perspective: Take Ownership of Your Professional Learning" (Jaclyn Snyder); (20) "Listening to Teachers" (Leslie Sears Gordon); (21) "Student Work around the World" (Erma Anderson); and (22) "Resources for Designing Your Own Professional Learning" (Carol Damian and Terese Herrera). Includes a



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CD-ROM entitled "By Your Own Design" to help build a personal professional learning guide. (YDS)

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A Magazine for Classroom Innovators

*Volume 9, Number 1, 2002*

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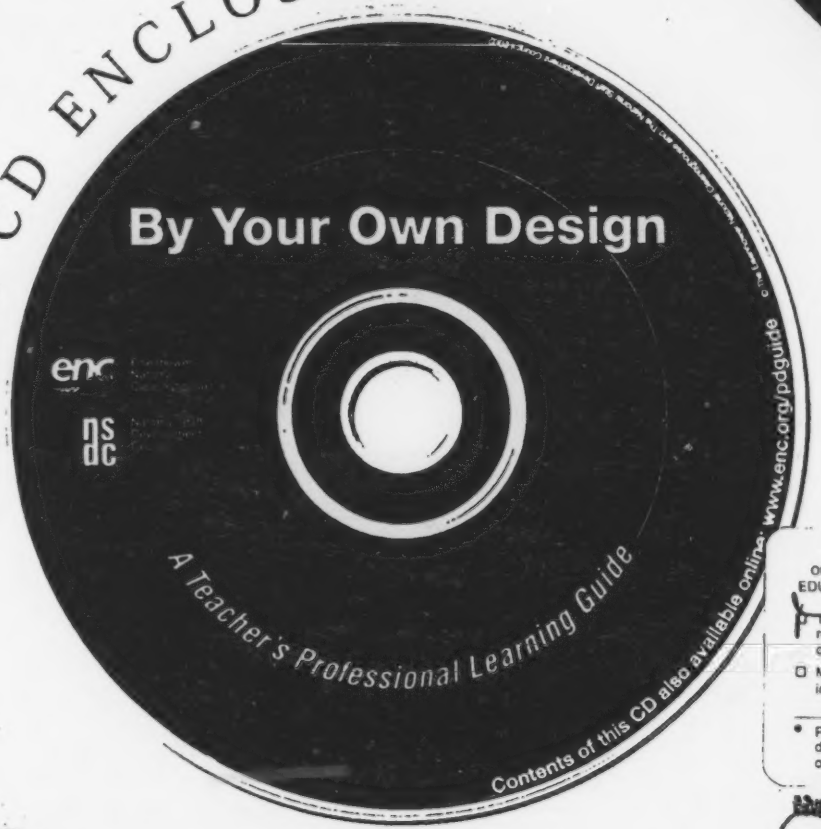


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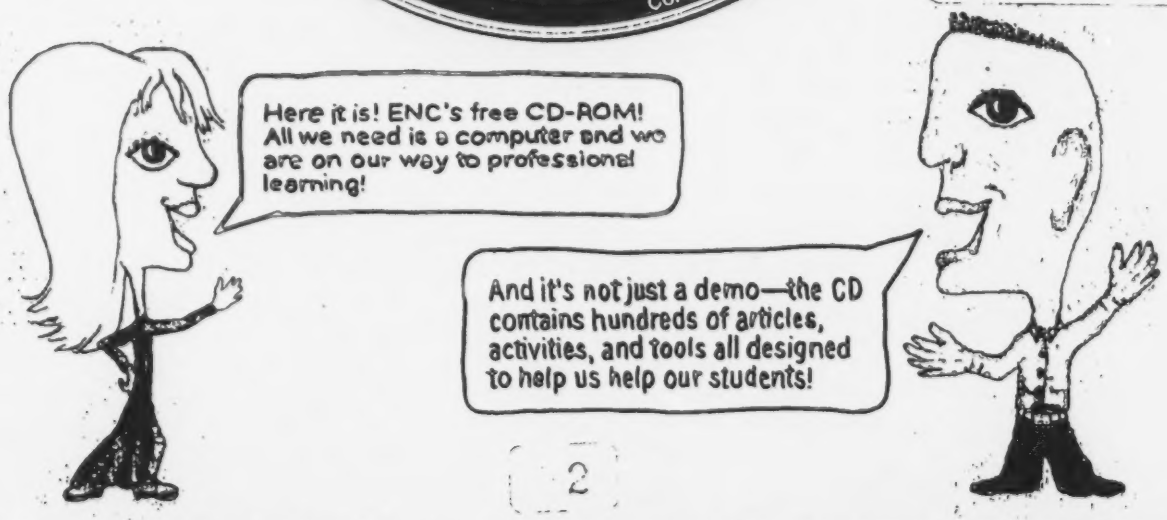
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he enclosed CD-ROM is a joint project of the Eisenhower National Clearinghouse, the National Staff Development Council, and other experts in professional learning for mathematics and science teachers.

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# Open up the enclosed CD-ROM and here's what you'll see!

## Get started...

Start here for an introduction to the CD and a guide for planning your professional learning.

## Build a foundation...

Explore the many context factors that influence your professional development, including the needs of your students and the challenges in your community—both inside and outside your school.

## Select learning strategies...

There are so many ways to structure your learning activities, whether you're working on your own or with the entire district.

You Are Here > Home
By Your Own Design — A Teacher's Professional Learning Guide —
Welcome
This CD-ROM is designed to help teachers create, imple
and evaluate professional development plans and activiti
Pathways by Role
Follow special paths to find information for your teaching and learning situation.
Newcomer's Overview
Find out what to do first, what not to miss, and what technology you need to do it all.
Develop a Learning Plan
Use these guidelines to set and reach learning goals for yourself and your students.
Jump Start Your Le
Explore quick links to your most pressing p
ional development ne

## Measure results...

Learn to evaluate your progress toward your goals.

## Learn more...

Extend your learning beyond the CD, with references to additional resources and to organizations that can help.

Any time you lose your way, reach out for the **Site Map** to see the structure of the entire CD. The outline is also printed on the next page!

*The Eisenhower National Clearinghouse for Mathematics and Science Education is funded by the U.S. Department of Education, Office of Educational Research and Improvement.*

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## Directions for Using this CD-ROM

System requirements

To begin using this CD-ROM

Adobe PDF (Portable Document Format) documents

Audio and video clips

# By Your Own Design:

## *A Teacher's Professional Learning Guide*

This outline of the CD gives an overview of the topics covered. Each section contains several articles, discussion tools, and references to additional resources.

### Get started...

- Introduction
- Create your learning plan
- Use the NSDC Standards

### Build a foundation...

#### Take stock

- Administrative support
- Time issues
- Funding issues
- Public engagement
- The change process

#### Take action

- Analyze student data
- Emphasize student learning
- Build leadership capacity
- Build learning communities

### Select learning strategies...

- Increase subject knowledge
- Improve curriculum
- Examine student work
- Conduct action research
- Examine case studies
- Join study groups
- Conduct lesson study
- Use technology
- Form partnerships
- Coach and mentor

### Measure results...

- Conduct evaluation
- Connect teacher and student learning

### Learn more...

- Selected resources
- References
- Tools
- Professional development providers
- ATEA at ENC — A Case Study

*This frame was created by www.evolutionary.com. Please do not remove a copy of the CD-ROM inserted here. The author thanks you for the use of the inserted graphics and hopes you enjoy the other educational resources on the CD. Simply cut along the dashed line and fold in two.*

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# By Your Own Design

*A Teacher's Professional Learning Guide*

## By Your Own Design:

*A Teacher's Professional Learning Guide*

The National Staff Development Council and the Eisenhower National Clearinghouse for Mathematics and Science Education have created this collection of resources to assist teachers in creating, implementing, and evaluating professional learning plans.

This CD-ROM was designed to help educators create strong professional learning programs in which:

- professional learning is built into the daily work of the school with support from administration.
- student achievement data and goals are used to determine the content of professional development.
- teachers make decisions about the learning experiences in which they will be involved.
- collaborative groups work together in solving school challenges.

*If you have trouble loading this CD, or if you cannot locate your copy of the CD-ROM, turn to page [illegible] for directions.*

Directions (continued)

### Navigation elements

The purple tabs running vertically down the left side represent the five major categories of content on the CD-ROM. When you click any of these tabs, a menu will open showing you the subcategories within that section. You may click on the tabs of these subcategories, or on the text links within the body of the page, to get to the next level.

Along the top and bottom of most pages of the CD-ROM, you'll see what are called breadcrumbs—the trail you follow as you move deeper into the CD. You can click on any link on the breadcrumb to backtrack or return to the start page.

### Printable version

[illegible] CD is a PRINTABLE VERSION [illegible] this takes you to a [illegible] page that [illegible] is designed to print a single [illegible] Some teachers like to have printable versions [illegible] From the printable version [illegible] by clicking on the links at the top of the page.

### Using templates electronically

[illegible] the planning and reflection [illegible] in RTF (Rich Text Format) [illegible] and edit them using [illegible] reference pages [illegible] the RTF [illegible] to your hard drive [illegible] and then [illegible] RTF [illegible] using [illegible] text processing [illegible]

### Linking to web sites from the CD

[illegible] are [illegible] By Your Own Design [illegible] you click on links to such [illegible] to navigate [illegible] you know [illegible] the CD-ROM and [illegible] browser.

[illegible] the CD and [illegible] web resources only if your computer is connected to the Internet. If you are not connected, you can return to the page you were on prior to where you clicked on the web site link by clicking the BACK button of your browser.

*See pages 10 and 11 for more about making the best use of the CD to meet your professional learning goals.*



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## *The Mission of the Eisenhower National Clearinghouse*

is to identify effective curriculum resources, create high-quality professional development materials, and disseminate useful information and products to improve K–12 mathematics and science teaching and learning.

*To accomplish its mission, ENC...*

**Acquires** and catalogs mathematics and science curriculum resources, creating the most comprehensive collection in the nation.

**Provides** the best selection of math and science education resources on the Internet.

**Supports** teachers' professional development in math, science, and the effective use of technology.

**Serves** all K–12 educators, parents, and students with free products and services.

**Collaborates** with the Eisenhower Regional Consortia and many other organizations to promote education reform.

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enc focus
A Magazine for Classroom Innovators
Volume 9, Number 1, January 2002

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# *Update...*

## Around the Clearinghouse and the Nation

This section features columns, essays, and news of interest to classroom innovators.

**What is the Eisenhower National Clearinghouse?**

Funded through a contract with the Office of Educational Research and Improvement of the U.S. Department of Education, ENC was established in 1995 to collect and catalog curriculum resources for K–12 mathematics and science education and to disseminate information about federally funded educational programs. Our products and services have evolved to include a web site, ENC Online (enc.org), *ENC Focus*, a free quarterly magazine, and numerous other publications and services. For more information on ENC's vast collection of curriculum resources, see page 60.

**Editorial**

# Who's the Learner in Learner-Centered?

**by Gay Gordon, ENC Publishing**

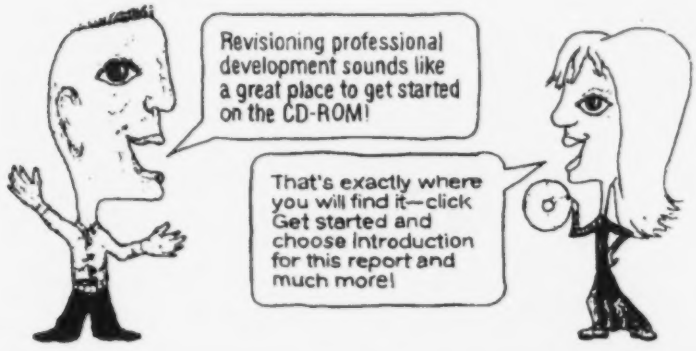
A report titled "Revisioning Professional Development" from the National Partnership for Excellence and Accountability in Teaching (NPEAT) was included in the summer 2000 issue of the *Journal of Staff Development*. The report discusses the need for learner-centered professional development for teachers and developing professional learning communities in schools. The NPEAT project, established to study and influence the quality of teaching, has now been concluded.

At the time the report came out, we were getting ready to host the ATA (Authentic Task Approach) Institute (see pages 9 and 26), and the report caught our attention. During the ATA Institute, we referred many participants to the report because it seemed to fit so well with our goals. The Authentic Task Approach models learner-centered professional development by requiring teams to engage in goal setting and meaningful work on a task of their choice. An ATA program is decidedly not endless presentations and more "sit and get."

For a long time, we used the title "Learner-Centered Professional Development" for the enclosed CD-ROM and this issue of *Focus*—in fact, that was the title announced months ago in this magazine. But we found that many people were baffled by the learner-centered part. Did it mean that professional development is somehow focused on student learning? Or did it mean that the teacher is the learner? People seemed to think that it had to be one or the other—it couldn't be both. When people asked me "Does this refer to the teacher or the student?" I just said yes, and suggested they read the NPEAT report.

To quote the report, "...conditions for optimum student learning have their counterparts in environments for teacher learning." And "...a teacher's professional life centers on what defines him or her as a teacher—knowledge of what students should be learning and the expertise to enable all students to be successful at meeting high standards. It is a totally learner-centered environment." In other words, you can't distinguish between teachers and students as learners in a learning community.

What we're striving for with this issue of *Focus* and the CD-ROM, *By Your Own Design: A Teacher's Professional Learning Guide*, is a time when people don't need an explanation of learner-centered. Everyone is a learner, and professional development is as much about the student as the teacher. Teachers won't


Revisioning professional development sounds like a great place to get started on the CD-ROM!
That's exactly where you will find it—click Get started and choose Introduction for this report and much more!

be "inserviced" any more. They will be actively involved in designing their professional learning and incorporating that learning into their everyday professional lives. Teachers will be both learning and modeling learning for their students, and the impact of this change will emerge as improved student achievement.

Many people, schools, and organizations are working toward this end, none more actively than the National Staff Development Council (NSDC), ENC's co-author for the CD-ROM. We are very grateful for their collaboration, and we encourage our readers to learn more about them and the work they do. A good way to do just that is to open the CD and explore what is there, including the full report "Revisioning Professional Development."

This is not the last time in this issue of *Focus* that you will be invited to explore the CD. That's because what we can fit in this magazine is only a sample of the rich content on the disc. The thoughtful essay "Dreaming All That We Might Realize" by NSDC executive director Dennis Sparks was written especially to introduce the CD, and it establishes the depth of the material found there (page 18).

Joan Richardson, NSDC's director of publications, is the guest columnist for our regular Using the Internet feature. Her article, "E-learning Potential" (page 12), was originally published in the September 2001 issue of *Results*, an NSDC newsletter. Rick DuFour's essay on teacher isolation (page 24) is reprinted from NSDC's Winter 1998 issue of the *Journal of Staff Development*. These are just two of scores of articles that NSDC contributed to this project.

Other organizations granted us permission to include outstanding, previously published articles on the CD. One such organization is the Northwest Eisenhower Regional Consortium for Mathematics and Science, which contributed an entire issue of its publication *Northwest Teacher* on the topic of lesson study. Excerpts are printed on page 34 of the magazine—you'll see that you are invited to open the CD for the rest!

The other articles are brand new, written especially for this issue of *Focus*—and you'll also find them on the CD. As always, we have contributions from classroom teachers and professional developers all over the country—from Jan French, who describes her exciting experience working with scientists at NASA's Kennedy Space Center (page 54), to Nebraska teacher Pam Galus, who enhances her professional learning by writing for professional journals (page 42), to Leslie Sears Gordon, a professional developer in Alaska (page 57). International perspectives are provided by Erma Anderson, who writes about the Schools Around the World program (page 59), and by the *Northwest Teacher* article about Japanese lesson study mentioned above.

Online professional development is a compelling topic. Joan Richardson warns of possible pitfalls in the Using the Internet column already mentioned, and Ann-Claire Anderson contrasts learner-centered and content-centered online programs (page 37). Judy Spicer describes an online course that capitalizes on the strengths of the Internet (page 32), while Wendy Gulley, Paul Hickman, and Stephanie Feger describe an online program from the Center for the Enhancement of Science and Mathematics Education (page 46).

Some kinds of professional learning simply cannot occur in cyberspace. Just ask Ronald Havlice, who writes about the personal connections that lead to ongoing professional learning in his district (page 39).

This issue of *ENC Focus* is full of innovation and inspiration—it always is, isn't it? And if you like what is printed here, you will love the CD-ROM. So here's another invitation:

Take a moment now to turn on your computer and pop in the CD.

You will be glad you did.


ENC invites readers to contribute articles to ENC Focus: A Magazine for Classroom Innovators.

**Join in the Dialogue!** *Write for* ENC Focus

**Topics and Deadlines:**

Success in the Urban Classroom - Submissions due March 1, 2002

Data-Driven Decision Making - Submissions due June 1, 2002

Special-Needs Students in the Mathematics and Science Classroom - Submissions due September 1, 2002

*Topics and deadlines subject to change without notice.*

See Writers' Guidelines on page 15.

# The Product of a Perfect Partnership

Have you noticed the CD-ROM in this issue of *Focus*? ENC could not have produced it alone!

**by Tracy Crow, ENC Publishing**

We figured we would aim high when we were looking for a partner for our next professional development project. Why not aspire to work with the National Staff Development Council (NSDC)? After all, they wrote the standards for staff development!

We couldn't have been happier when, early in 2001, NSDC agreed to work with ENC on creating and disseminating a new CD-ROM for teachers about learner-centered staff development. And now, we present that CD to you with this issue of *ENC Focus*.

*By Your Own Design: A Teacher's Professional Learning Guide* weaves together selections from NSDC and ENC publications, as well as contributions from a few other organizations. ENC has always published stories of teachers meeting new challenges. Coupling those with NSDC's practical ideas on designing effective professional development, we designed a product that combines successful models, useful strategies, and practical research. We hope that you like the combination as much as we do.

## Getting to Know NSDC

The National Staff Development Council produces three publications for its membership, and material from each has been included in the CD. The *Journal of Staff Development* is published quarterly and is theme-based, much like *ENC Focus*. Recent themes have included diversity, teacher quality, and the NSDC standards (published when the revised NSDC Standards for Staff Development were released in the summer of 2001). Articles range from interviews with key thinkers in and out of education to practical columns on professional development techniques and strategies such as learning communities and presentation skills.

Other NSDC publications are the newsletters *Tools for Schools* and *Results*. Both newsletters complement the themes covered in the journals, with *Tools*, as its name indicates, providing group-ready worksheets, assessments, and study guides. Selections from all the NSDC publications are available online (www.nsdc.org). The site also provides information about NSDC's annual conference, an opportunity for learning with the best staff developers in the country.

## The Authentic Task Approach: Focusing on the Learner

So how did we find ourselves heading down the path of learner-centered staff development in the first place? In 1999, ENC worked with the National Research Council to sponsor a leadership institute in Irvine, California. Mathematics and science state supervisors from more than 30 states gathered for the institute, which used a unique design for staff development called the Authentic Task Approach (ATA).

## NSDC's Authentic Task

by Joellen Killion, National Staff Development Council

The National Staff Development Council convened a work team to participate in the Authentic Task Approach Institute hosted and sponsored by the Eisenhower National Clearinghouse in October 2000. The team was composed of people who represented various perspectives on staff development and who had expressed an interest in assisting NSDC create a publication to address the question:

How do we evaluate staff development to demonstrate its impact on student achievement?

The team was able to explore a number of very productive aspects of the question, including the shifting paradigm in evaluating staff development and the debate on how student achievement is measured. We also discussed what readers of the intended publication would want to know.

As a result of the work of the team, the purpose and focus of the project was clarified and the audience for the book was narrowed. We also outlined the contents of the publication.

From our perspective, the greatest strengths of the ATA process were the team approach, having diverse perspectives in the room, and the opportunity to devote a concentrated block of time to one issue. In addition, the structure, facilitation, and readily available resources helped the team stay focused, maximizing time and energy use so that we were able to sketch out several fundamental pieces for the book. As the author of the book, I was able to listen intently to the discussion and to participate in ways I might not have if I had been responsible for facilitating the meeting. The ATA approach freed me to focus, challenge my own thinking, and understand differing perspectives.

Another benefit of this work is the replication of the ATA process for a collaborative effort sponsored by the Michigan Staff Development Council. One member participated on NSDC's team at ENC's institute and immediately saw the value of the process to advance the advocacy for professional development in Michigan. She is working with ENC to bring together members and representatives from other professional associations to use the ATA process to determine how the groups can influence professional development policy and practice within the state.

*Joellen Killion is director of special projects for the National Staff Development Council. Email: nsdckillio@aol.com*

The ATA model was developed by Learning Innovations, Inc., a division of the WestEd Regional Educational Laboratory. Key elements of the model include careful facilitation, clear goal setting, identification of relevant resources, and deep reflection. Institute attendees for any ATA event engage in intense preparation beforehand, identifying what problem they are going to investigate, either as individuals or as teams. With the participants' identified problems in hand, institute organizers are able to gather people and resources that will tailor the institute for each attendee.

What we liked the most about the Authentic Task Approach was its inquiry model of teacher learning and problem solving. As Gay Gordon, ENC's associate director for publications, points out in her editorial (see p. 6), teachers are learners just as students are, and can serve as exemplars of how to go about learning. That means identifying problems, investigating solutions, seeking knowledge that applies to your problems, encountering difficulties, and keeping the cycle of learning continuous.

## ATA at ENC

ENC was so impressed with the ATA model and Learning Innovations that we decided to draw upon their expertise again and host our own ATA Institute. "Planning for Results" was held in October 2000, and several Learning Innovations and ENC staff members served as facilitators for a wide variety of teams. (See article on p. 26.)

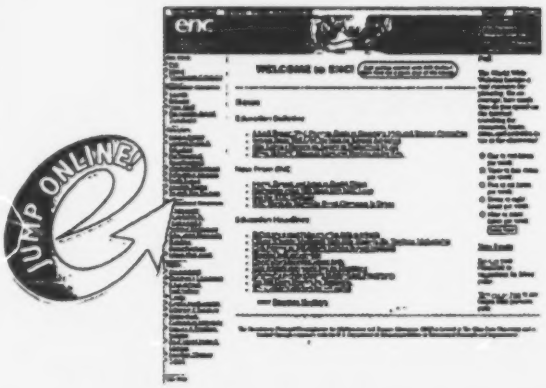
The institute was also an opportunity for many ENC staff members to "walk the walk" in professional development. Learning Innovations staff members conducted a two-day facilitator training before the institute. What we learned in that training was useful not only at the institute but also in our daily work; many ENC staff meetings are now conducted using ATA elements.

In-depth information about the Authentic Task Approach and Learning Innovations is included within the Learn More section of *By Your Own Design*. While ATA is most effective with outside facilitation, the principles and tools used in the model will be helpful to anyone seeking to shape a learner-centered event.

*Tracy Crow was formerly a member of ENC's publications team. Currently, she is a freelance project manager, writer, and editor.*

## Visit ENC's Web Site

# enc.org




**ENC Online** is designed to make the resources of the Eisenhower National Clearinghouse available to educators everywhere all the time. Here is a quick introduction to the site. We urge you to "jump online" and discover for yourself how helpful enc.org can be to you.

**Curriculum Resources.** In this area of the site, you can use a simple or advanced search to locate all types of teaching materials in ENC's collection of more than 19,000 items. The searches allow you to choose particular subject words, grade level, cost, and type of material to find exactly what you need for your classroom situation.

**Web Links.** Check this category for ENC's popular Digital Dozen feature. This monthly selection of exemplary math and science web sites can also be delivered to your email box if you choose to register. Web Links also connects to hundreds of sites with math and science lesson plans. A search feature helps you find Internet resources quickly and efficiently.

**Professional Resources.** This portion of the site is designed as a teachers' professional support system. ENC has gathered some of the most popular professional resources in one Timesavers area for quick linking and use. This section also provides links to the national mathematics and science education standards, and state frameworks are listed conveniently by state. Federally funded resources and professional development strategies are also available here.

**Topics.** Hundreds of articles, teacher interviews, and selected curriculum resources and web sites are arranged thematically in this area. Topics include inquiry and problem solving, educational technology, equity, and assessment. Many of these topics include the content developed for *ENC Focus*.

ENC Online also has a quick way to get to the full text of each issue of ENC Focus—try the *ENC Focus* Magazine area of the web site. In this area, you can also sign up for a free subscription to all future issues of the print magazine.

The entire contents of the CD-ROM *By Your Own Design: A Teacher's Professional Learning Guide* are available online: enc.org/pdguide



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# *Key Features of*

## **By Your Own Design:** *A Teacher's Professional Learning Guide*

Hundreds of articles and links to web sites. Plenty of planning and reflection tools. References, casebooks, video clips ... this CD-ROM is loaded! Along with all of that, we designed special features to help you make the most of the CD.

### Pathways

So many resources can be overwhelming — where should you start? From the home page, you can choose any category and just take off. For a quicker glance at what you should explore, choose the pathways graphic on the home page. There are two teacher pathways — one for a teacher who has already begun the planning process and one for a teacher without a plan in place. Other pathways are for teacher leaders, staff developers, and principals.

Each pathway starts you out with just a few resources from the CD, taking you directly to helpful articles. You can leave the pathway at any time to explore other resources along the way, or you can work through the five or six articles in the pathway and decide later what you need to explore in depth. The Jump Start chart on the next page is another way to click directly to a section based on your needs.

### Planning guide

In Get started, one of your choices is Create your learning plan. You'll use tools in this section to set goals in a way that works for your situation — there are several options.

We know that many teachers are already required to fill out a professional development plan for their school or district, so you may not need to go through the whole process of planning. But you'll want to consider your goals in the context of how to pick and choose among the many resources on the CD.

### Selected resources

The ENC Collection — at the heart of the work that ENC does. That's why you'll find suggested materials linked from all sections of the CD. Choose the Selected resources icon to learn about high-quality resources to support the key topics.

Available resources are described in full, with ordering information and prices. You can also find the complete list of selected resources on the home page of ENC's Internet site.

### Tools for reflection

Most of the articles on the CD have reflection and reflection tools. The tools summarize the key points of the article and have questions for you to consider after you read. Related articles in other sections of the CD are listed at the bottom of each tool. You can use these tools on your own, or you can use them in discussions with a colleague or a group.

To accommodate all types of reflection, the CD also contains RTF (Rich Text Format) versions of the tools which means you can download a couple of the questions and keep a journal on your computer. RTF files work with most word processing and text programs.

### Working with groups

There's more than the tools for working with your peers. Several outlines and templates for learning activities are included throughout the CD. While you will come across them in each section arranged by topic, you can always go to the Learn more — Tools section to find them all gathered in one place.



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# JUMP START

This list gives some quick ideas about where to start your journey through *By Your Own Design: A Teacher's Professional Learning Guide*. The CD is loaded with a wealth of articles, but we know you have limited time so we've created the chart below to help you get started. We've also included some questions to consider as you explore different parts of the project.

You'll also find this chart within the Getting Started–Introduction section of the CD-ROM so you will be able to instantly link to each section listed here.

| If you need | Check this location on the CD | And then consider |
|---|---|---|
| Planning ideas | Create your learning plan | What does your district require in terms of a professional development plan? |
| More time to learn | Time issues | What would it take to implement just one idea from these articles? |
| Standards for teachers' professional learning | Use the NSDC Standards | Which of these standards am I meeting in my staff development efforts? |
| Goal-setting guidance for your learning plan | Emphasize student learning | How can I find out what my students need? |
| To overcome teacher isolation | Build a learning community | How can I build support for creating a learning community? |
| Techniques for professional learning | Select learning strategies... | Which of these strategies makes sense in light of the goals I have set for myself? |
| Help with a new curriculum program | Improve curriculum | Do I have the content knowledge and support I need to use a new curriculum program effectively? |
| Math and science teacher stories | Find articles by grade level and subject | Which classrooms and teachers inspire me to improve? |
| Ideas about assessing my professional development | Conduct evaluation | How can I measure the effectiveness of my learning? |
| Activities to use with groups | Tools | In what context will these activities make the most sense? |

# E-learning Potential

Online staff development has great possibilities—and pitfalls.

by Joan Richardson, National Staff Development Council

Is this your image of online staff development? A teacher sits alone at a computer in the family room at home quietly clicking from one screen to the next as colorful lessons flash before her eyes. She types in responses to questions but talks to no one about what she's learning. When she's finished her online course, she fills out the required inservice sheet, gets her inservice points, and moves on.

Or, is this your image of online staff development? Using conferencing software, a teacher is connected online to others who teach the same subject. They develop lesson plans keyed to newly introduced state standards in mathematics. They edit each other's lessons and, after they use the lessons with students, they return to an online discussion group to share their experiences with each other.

In today's rapidly expanding world of e-learning, both images are possible. Online staff development offers enormous opportunities to customize learning around individual teacher needs and to make learning convenient for teachers. Learning can be "just in time" when teachers need it most. E-learning provides a confidential setting in which teachers can learn basic skills or it can open doors to allow teachers to network with colleagues across their districts or across the country.

But e-learning also has the potential to accentuate the worst parts of traditional staff development—the fragmentation and the isolation—without any monitoring of the rigor of the work that teachers are doing, according to Joellen Killion, director of special projects for the National Staff Development Council and co-author of a newly released set of technology standards, *E-Learning for Educators: Implementing the Standards for Staff Development* (www.nsdc.org/standards_tech.html).

"I fear that people will be looking only at what the individual wants and not at schoolwide needs. We could have a high school of 125 teachers each doing his or her own thing and not working together to move the whole school in the same direction," she said.

Dennis Sparks, executive director of the National Staff Development Council, fears electronic learning may become a "force that moves teachers away from daily collaboration with colleagues in professional learning communities within their schools.

"It's essential, from my point of view, that a significant portion of teachers' professional learning occur in school each day as teachers together plan lessons, critique student work, and examine various forms of data from their school. To the extent that electronic learning aids these core team-based functions, it may well serve schools and students. To the extent that it adds to incoherence and fragmentation of effort, it contributes to the squandering of a precious resource—teachers' professional knowledge and skill," Sparks said.

## Larger Districts Develop Their Own E-Learning

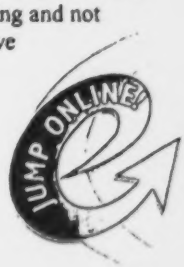
Offering any kind of professional development is a challenge in Clark County, Nevada. The 8,000-square-mile school district, which includes the city of Las Vegas, employs 23,000 teachers. They work in schools as small as a two-room, two-teacher building and as large as a 4,000-student suburban high school.

As director of technology development services in Clark County, Karlene Lee manages seven teachers on special assignment and nine technology specialists, all of whom are devoted to professional development. Hers is only one of eight different groups in the district that offer staff development.

The district had been offering 15-hour courses on a variety of topics. Format of each course included face-to-face meetings at the beginning, middle, and end of the course and eight class meetings online. For such courses, teachers earned one professional development credit.

But the district is shifting to another model because of the cost and difficulty of bringing together teachers from such a large district. Although the plan is in its early phases, this is how the new Clark County model is intended to work:

A group of fourth-grade teachers from various parts of the massive district collaborate online to write model lesson plans for a new social studies unit. The teachers initially meet face-to-face to check software and ensure that everyone is clear on the goal of their work and the structure of how they will work. Teachers do not meet again face-to-face during this project.




Help improve online professional development by responding to an NSDC survey: www.nsdc.org/onlinesurvey.htm

For several months, the teachers meet online weekly at a designated time. Initially, they spend time learning about the state's new social studies standards. Via videoconferencing, a local university professor is their content resource as they prepare to write lessons.

Using an online conferencing product, the teachers collaborate to write lesson plans. The software allows one user to open a document with a lesson plan while other teachers edit the document, refining and improving each piece. They discuss their proposed changes via an audio link. The software also links to a whiteboard so teachers can sketch out images to help others better understand their ideas.

"Everyone can edit. If one teacher develops an activity, everyone can see it. One person might make it, but many can edit it and improve it," Lee said.

If the group encounters a question while online, one of the teachers can move easily onto web sites that will help her locate the answer. When their work is done, the lesson plan is saved in a file that is accessible to participants.

"Offering this mode of collaboration to very low-level technology users would be very frustrating. But for those who have intermediate to advanced skills, it's very good. They like the face-to-face piece of the first model, but they love not having to travel in order to meet with other teachers," Lee said.

## Standards for Online Learning

Killion urges districts to hold electronic learning to the same standards they set for face-to-face learning.

In developing *E-Learning for Educators: Implementing the Standards for Staff Development* (see box), NSDC consulted a group that included vendors, union representatives, and K-12 educators. They listed dozens of questions that administrators should consider as they either purchase or develop online courses.

Killion worries that school districts will add online staff development to their repertoire without carefully thinking through how online fits into a comprehensive program of professional learning. "I worry that it will be an add-on and that there won't be any value added because of it," she said.

"The questions I think are most important are: How do we know we need it, how do we know it's something of value for us, and how do we know it's going to increase student learning?" she said.

Killion said none of the products she's aware of have data about the impact on student learning. "They can give you data on the number of users and the completion rates. But they're a long way from having student data," she said.

NSDC executive director Dennis Sparks repeats that concern. "The ultimate test is whether the achievement of all students is increased because the electronic learning deepens teachers' content knowledge, broadens the range of research-based instructional strategies available to them, and helps them use classroom assessment more effectively," he said.

*Joan Richardson is director of publications for the National Staff Development Council. In that capacity, she serves as executive editor of the* Journal of Staff Development *and other NSDC publications. For more information about NSDC, visit the web site (www.nsdc.org).*

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**New from the National Staff Development Council:**
*E-Learning for Educators*

*E-Learning for Educators: Implementing the Standards for Staff Development* is a 42-page resource guide that will help districts and schools make sound decisions about the design, purchase, and implementation of e-learning programs, products, and services as a part of their comprehensive staff development plan. Developed by a team of experts in technology, staff development, and distributed learning, the guide uses NSDC's *Standards for Staff Development, Revised* as the basis for examining technology-mediated learning. The guide contains questions that districts and schools will want to answer as they consider integrating e-learning into their staff development programs.

*E-Learning for Educators* is co-authored by NSDC and the National Institute for Community Innovations (NICI) and made possible through catalyst grant funds provided by the U.S. Department of Education's Preparing Teachers to Use Technology program.

The guide is available online (www.nsdc.org/standards_tech.html) or order Item # B155: $12 NSDC Member price; $15 Non-member price.

# A Review of *Evaluating Professional Development*

Good evaluation can inform decision making about professional development. Thomas Guskey's latest book demystifies the process.

**by Gay Gordon, ENC Publishing**

One of the most important things you can do in terms of your own professional learning is read, but you might not choose a book like *Evaluating Professional Development* by Thomas R. Guskey. In fact, when someone mentions evaluation and professional development in the same breath, what comes to mind? Do your eyes glaze over as you think of the form you get at the end of a workshop asking you such questions as did the topic address your needs, was your time well spent, or did you enjoy the refreshments?

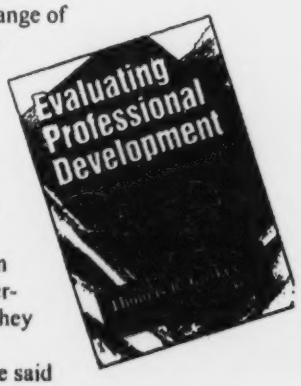
Guskey believes these are good questions to ask, but he contends that too often professional development evaluation stops there, or even worse, never even gets to these questions. Good evaluation can inform decision making about professional development processes and effects (p. 2), and good evaluation does not have to be difficult. In fact, Guskey's book demystifies evaluation through its outline of five critical levels for evaluation of professional development, 12 guidelines for planning, clear explanation of evaluation terminology, lists of reflection questions, and sample evaluation forms. The author's quotes and notes even make the book entertaining.

## Intentional, Ongoing, and Systemic

Guskey stresses that professional development must be an intentional, ongoing, and systemic process. In other words, professional development should have clearly stated goals; educators should be involved in continuous learning over the span of their careers; and both the individual and the organization must be considered.

According to Guskey, there are three major mistakes in evaluating professional development. First, evaluation may amount to no more than documentation of activities completed over a period of time. The second mistake is that evaluation does not go deeply enough, and third, evaluation is too brief. Just as professional development should be an ongoing process, so should its evaluation.

Guskey emphasizes that good professional development is a process, not a product. You must know what you want to accomplish. Only then can you outline how to reach your goals, decide what evidence will show that you have made progress, and determine how you can gather and analyze the evidence. You must always be open to review, revision, expansion, and change of your professional development plan (p. 252).




One of the researchers Guskey quotes is Ralph Tyler, who believes that educational programs are largely time-based, rather than learning-based. Instead of saying explicitly what students should know and be able to do when they finish high school, we are generally only able to state for sure that they spent 12 or 13 years in school.

Guskey says that the same can be said for professional development. Rather than being based on clearly stated professional goals, many professional development programs mandate a certain number of hours. Teachers ask, "How can I get my hours?" not "What do I need to learn?" He urges professional developers to focus on the intentions of the professional development and to plan carefully to meet those goals instead of finding ways to fill hours (p. 124).

## Five Critical Levels

Guskey suggests five critical levels for evaluation, the first of which is gathering participants' initial reactions. It is important to do this to improve the design and delivery of programs, but evaluation should not stop there.

At the second level, evaluation measures participants' learning. This will probably involve more than a questionnaire; it may be necessary to use logs or journals, depending on the type of learning goal.

The third level evaluates organizational elements at the school and district level that can be ". . .defining factors in a program or activity's success" (p. 151). If your personal or collaborative professional development efforts have floundered from lack of resources or support, you understand how organizational problems influence the outcome. Guskey suggests some ways to address organizational issues, such as methods to provide additional time for teachers to collaborate. He also lists and describes aspects of organizational support and change, as well as ways to gather information about the organization.

The fourth critical level of evaluation assesses participants' use of new knowledge and skills. Guskey describes how this can be accomplished using such methods as observation, interviews, or focus groups.

At the fifth level, student learning outcomes are measured. Guskey acknowledges that it is impossible

to determine simple cause-and-effect relationships between professional development and improvement in student learning. He advises that in the absence of proof, you should collect good evidence, which does not have to be a lengthy and difficult process.

## Good Professional Development on a Small Scale

Guskey provides a very practical example that demonstrates how teachers can accomplish good professional development on a small scale without the help of a consulting firm or even a trained evaluator.

In his example, two teachers take a seminar to improve their mathematics teaching. Then they plan changes in their lessons and instructional strategies, and during the school year they keep careful track of the changes they make. They document the impact on students as they continue meeting and planning more activities. At the end of the year, they summarize the information they have gathered in a report that compares student achievement after the teachers used new plans and strategies in their classrooms with student performance in past years (p.253). This straightforward approach provides very powerful evidence of the effectiveness of their professional development effort.

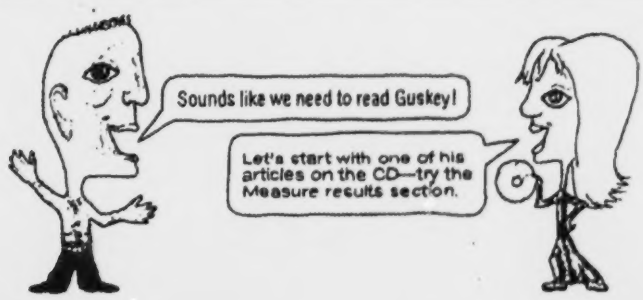
Before you decide that evaluating professional development sounds like more than you have the time or expertise to accomplish, take a look at Guskey's book. Or even better, find the opportunity to go hear him speak. He will convince you of the need for evaluation that is deliberate and delves deeply into using professional knowledge and student outcomes. And, more important, he'll inspire you to do it.

*Gay Gordon is the associate director for ENC publishing. Her column Required Reading will be a regular feature of* ENC Focus. *Email: ggordon@enc.org*

**Publication Information**

Guskey, Thomas R. (2000). *Evaluating Professional Development.* Thousand Oaks, CA: Corwin Press. 308 pp., $74.95 hard cover; $34.95 paperback. ISBN 0-7619-7561-6. order@corwinpress.com

To read articles by Thomas Guskey on evaluating professional development, finding time, and goal-setting, see the CD-ROM, *By Your Own Design: A Teacher's Professional Development Guide,* included in this issue of *ENC Focus.* Guskey is professor of Educational Policy Studies and Evaluation at the University of Kentucky. He is a regular presenter at the annual conference of the National Staff Development Council, co-author of the CD-ROM.




# Writer's Guidelines for ENC Focus

**Detailed Writers' Guidelines are available online at**

**enc.org/focus/write**

*Here are Guideline highlights:*

Articles submitted for consideration should be grounded in the national educational standards while being short (500 to 2,000 words) and compelling. It is essential that articles promote educational equity and advance the principle of "education for all." We particularly invite teachers to write about their classroom experiences, using first person and a conversational tone. Please note that library research papers written in academic language for graduate school courses are unlikely to be selected for publication. We do, however, encourage you to include a few, carefully chosen references or a brief reading list. All content must be original, and all quotations must be properly cited. ENC is not interested in publishing articles that have the main goal of promoting commercial products.

Photos or other illustrations add interest, and good illustrations increase your chances for publication. Students in laboratory settings must be shown following appropriate safety guidelines and wearing proper safety attire, including eye protection. Please note that we can use photos of children under 18 years of age only if we receive written permission signed by a parent or guardian.

Authors of unsolicited manuscripts are urged to send a brief proposal via email well in advance of the deadline for the upcoming topic. We prefer that manuscripts be submitted electronically. Each manuscript must be accompanied by the full names, postal addresses, telephone numbers, and email addresses of all authors.

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Improving Mathematics and Science Education

# EISENHOWER NETWORK

ENC is part of the National Network of Eisenhower Regional Consortia and Clearinghouse, a nationwide collaboration that provides support to mathematics and science educators across the country. In addition to ENC, the Eisenhower Network includes ten Eisenhower Regional Consortia that work toward these goals:

- To identify and disseminate exemplary mathematics and science instructional materials;
- To provide technical assistance to educators in implementing teaching methods and assessment tools;
- To collaborate with local, state, regional, and national organizations engaged in educational improvement.

Also part of the Eisenhower Network are 12 ENC Demonstration Sites—one in each region, one at ENC on The Ohio State Univesity campus in Columbus, Ohio, and one at The George Washington University in Washington D.C. These sites provide visitors with the opportunity to access ENC services electronically and to pick up free publications.

In recent years, the Eisenhower Network has spread even further with the creation of ENC Access Centers. Located throughout the country, these volunteer centers are staffed to distribute ENC publications and to teach local educators about the Eisenhower Network. There are already 125 Access Centers, with more added each month.

## Contact the Eisenhower Consortium or ENC Demonstration Site that serves your state for assistance in improving mathematics and science education.

### Northwest Region

Alaska, Idaho, Montana, Oregon, Washington

**Consortium**

**Northwest Eisenhower Regional Consortium for Mathematics and Science at NWREL**
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Mathematics and Science Education Center
Northwest Regional Educational Laboratory
101 SW Main Street, Suite 500
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Phone: (503) 275-9500
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Email: math_and_science@nwrel.org
URL: www.nwrel.org/msec/nwerc

**demo site**

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Northwest Regional Educational Laboratory
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URL: www.netc.org

### Far West Region

Arizona, California, Nevada, Utah

**Consortium**

**WestEd Eisenhower Regional Consortium for Mathematics and Science Education**
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Steve Schneider, Co-Director
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Fax: (415) 512-2024
Email: asussma@wested.org
program: werc@wested.org
URL: www.wested.org/werc

**demo site**

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Biodiversity Resource Center
California Academy of Sciences
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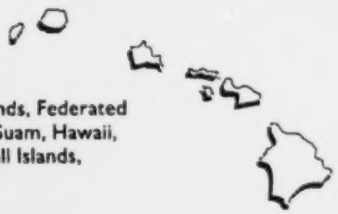
Fax: (415) 750-7106
Email: dsands@calacademy.org
URL: www.calacademy.org/research/library/biodiv/educate.htm

### Pacific Region

American Samoa, Commonwealth of the Northern Mariana Islands, Federated States of Micronesia, Guam, Hawaii, Republic of the Marshall Islands, Republic of Palau



**Consortium**

**Pacific Eisenhower Mathematics and Science Regional Consortium at PREL**
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Phone: (808) 441-1300
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**demo site**

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Fax: (671) 478-0215
Email: borjaa@prel.org

### Eisenhower National Clearinghouse for Mathematics and Science Education

Columbus, Ohio

**demo site**

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The Ohio State University
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Columbus, OH 43210-1079
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Email: ghaskins@enc.org
URL: enc.org

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Eisenhower National Clearinghouse



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## North Central Region

Illinois, Indiana, Iowa, Michigan, Minnesota, Ohio, Wisconsin

**Consortium**

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**demo site**

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Fax: (630) 840-2500
Email: sdahl@fnal.gov
URL: www-ed.fnal.gov

## Mid-continent Region

Colorado, Kansas, Missouri, Nebraska, North Dakota, South Dakota, Wyoming

**Consortium**

**McREL Eisenhower Regional Consortium for Mathematics and Science**
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# *Focus on*

## By Your Own Design

### A Teacher's Professional Learning Guide

This section presents articles on the theme of this issue.

**Themes for *ENC Focus***

Each issue of *ENC Focus* presents articles on a theme of interest to educators from many states. Previous issues have covered topics such as Teaching in the Standards-Based Classroom, Making Science Work for Every Child, Mathematics & Science in the Real World, Assessment That Informs Practice, Integrating Technology in the Classroom, and Inquiry & Problem Solving. The online version of *ENC Focus* (enc.org/focus) provides the full text of all issues.

The best source of new ideas and helpful tips for improving science and mathematics education is the classroom teachers. We invite you to join the community of *ENC Focus* writers. Check page 2 for upcoming themes. Our guidelines for writers appear on page 45 and online (enc.org/focus/write).

# Dreaming All

The executive director of the National Staff Development Council wrote the following article as the introduction to *By Your Own Design: A Teacher's Professional Learning Guide*, the CD-ROM included with this issue of *ENC Focus*. The *Guide* is co-authored by NSDC and ENC.

**by Dennis Sparks, National Staff Development Council**

*It is no failure to fall short of all that we might dream. The failure is to fall short of dreaming all that we might realize.*
—Dee Hock, VISA Founder

The good news: There is agreement among policymakers and education leaders at all levels that high-quality professional learning for teachers and administrators is essential to the success of standards-based reform.

More good news: Practitioners and researchers agree for the most part on the characteristics of such professional development.

But here's the bad news: Only a fraction of the more than three million public school educators in the United States participate in such professional learning on a regular basis. The materials on the CD-ROM *By Your Own Design: A Teacher's Professional Learning Guide* are intended to close this gap.

You will use *By Your Own Design* because you are an administrator or teacher who is part of a leadership team responsible for your colleagues' professional learning, a teacher designing an individualized professional development plan, or an educator pursuing professional learning to make you more skillful in your own work. No matter what your purpose, however, I encourage you to keep three important points in mind.

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# That We Might Realize

## 1. The nature of your professional learning goals will have a large effect on the benefits you derive from the materials on the CD.

School and district improvement goals provide direction for your professional learning. So do the unique learning requirements of your students and the professional challenges you experience in your work.

In addition, your goals are often invisibly influenced by the fundamental choices you have made (or by those made by school leaders) and the mental models you hold about teaching and student learning. The fundamental choices you make determine the desire and commitment you bring to these materials and to the professional learning you will take away from them. The mental models or big assumptions you hold have a large, often unrecognized influence on your professional learning and the subsequent changes you make.

You Are Here > Home
By Your Own Design — A Teacher's Professional Learning Guide —
Welcome
This CD-ROM is designed to help teachers
and evaluate professional development
Newcomer's Overview
Find out what to do first, what not to miss, and what technology you need to do it all.
Pathways by Role
Follow special paths to find information for your teaching and learning situation.
Develop a Learning Plan
Use these guidelines to set and reach learning goals for yourself and your students.
Jump Start Your Learning
Explore quick links to meet your most pressing professional development needs.
This CD-ROM is a joint project of the Eisenhower National Clearinghouse and the National Staff Development Council.
You Are Here > Home
Printable Version



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## Fundamental Choices

Fundamental choices express our deepest aspirations and possess a tremendous power to shape and sustain high performance. These choices also provide a filter for planning activities and sustaining motivation during difficult times.

"A fundamental choice," Robert Fritz (1989) writes, "is a choice in which you commit yourself to a basic life orientation or a basic state of being" (p. 188). Examples include being true to what is highest within you and being healthy and free. Primary choices, Fritz says, are those we make about the major results we wish to create, and secondary choices are the steps we take toward achieving those results. Fundamental choices are important because they provide the foundation for primary (professional learning goals) and secondary choices (methods for acquiring the learning).

Educational leaders can make fundamental choices that lead to deep change and significant improvements in student learning, or they can make choices that maintain the status quo. A principal, for example, who has made a deep commitment that all students must have a competent, caring teacher will approach professional development in his or her school with a seriousness of purpose and depth of understanding formed by that commitment.

Likewise, a teacher who has made a fundamental choice to teach all students to deep levels of understanding will establish professional learning goals and select learning methods that are far more powerful than those of a teacher who has made a fundamental choice to teach only those students who demonstrate a strong desire to learn. When professional development activities are not aligned with more basic fundamental and primary choices, they are difficult to sustain and are often dropped at the first signs of difficulty or challenge.

The fundamental choices made by administrators and teachers in leadership roles have a profound effect on the primary and secondary choices they and others make. That is why the quality of staff development in a school system or school rarely exceeds leaders' ambitions for student learning.

## Mental Models

Educators' mental models also play key roles in establishing professional learning goals and improving practice. Mental models are our beliefs and perceptions, the images and assumptions that are an important part of who we are. Some people use the terms "paradigms" or "scripts" as synonyms. Because they are often hidden from view, mental models may remain undiscussed, with their influence on behavior unrecognized. And because they are undiscussed, it is easy to assume that everyone shares our view of reality, which is typically not the case.

Kati Haycock, director of the Education Trust, sees teachers' belief systems and will to change as the largest barriers to significant improvement (Sparks, 2000). She also views skill building as a critical strategy in changing beliefs. Haycock suggests that teachers and principals visit schools similar to their own that are higher performing and explode myths by sharing data and examples from those schools. "In my experience," she notes, "it is not worthwhile to attack the issues of beliefs without simultaneously building skills" (p. 39). Haycock concludes that "When teachers think something is important and valuable, they find a way to make it happen" (p. 39).

Peter Senge (2000) lists a number of outdated "industrial-age assumptions" about learning and school—children are deficient and schools fix them, there are smart kids and dumb kids, schools communicate "the truth," learning is primarily individualistic, and competition accelerates learning.

Other examples of such impeding beliefs include:

- Students who live in poverty or who lack supportive families cannot be expected to learn very much. Consequently, powerful forms of professional development are wasted on schools with high concentrations of such students.
- Teaching is a low-skilled, nonintellectual activity. Consequently, sustained, intellectually rigorous forms of professional development squander precious resources.

Teachers know what to do to teach to high standards; they simply have to be induced to do so. Consequently, motivational speakers or threats of negative consequences are sufficient to improve teaching and student learning.

Teaching methods can be changed by "experts" who "deliver" knowledge of good teaching in workshops. Consequently, it is sufficient to expose teachers to new ideas without regard for the ongoing collaboration and sustained practice with feedback usually associated with changing complex behaviors.

A more accurate and productive set of beliefs include:

Quality teaching fed by powerful professional learning can make a difference in all schools.

Teaching is a complex, intellectually demanding task that requires sustained, intellectually rigorous forms of professional development.

Teachers are contributing their best efforts.

Professional development that promotes a deep understanding of subject matter and a wide repertoire of research-based teaching strategies is essential if all students are to achieve at high levels.



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Robert Kegan and Lisa Lahey (2001) say that humans are often unknowingly tethered by self-protective and contradictory commitments that undermine their expressed purposes and goals. "[F]or every commitment we genuinely hold to bring about some important change, there is another commitment we hold that has the effect of preventing the change," they write (p. 63). For instance, a principal who is committed to ensuring quality learning for all students may find that she has another not very clearly articulated commitment to avoiding conflict because of fears that such conflict will escalate out of control and she will be viewed less favorably by other staff members.

An individual's sense of efficacy is particularly powerful when it acts in concert with the beliefs of others. For instance, Valerie Lee and Suzanna Loeb (2000) propose a continuum for viewing a school faculty's collective sense of responsibility for student learning. At one end of the spectrum are schools with teachers taking personal responsibility for the success or failure of their own students, with teaching and learning as an interactive process. At the other end of the spectrum, teachers locate the blame for low performance outside their own teaching. Lee and Loeb's research determined that teachers' senses of collective responsibility were more positive in elementary schools with fewer than 400 students and that teachers' sense of collective responsibility had a positive influence on student learning.

## 2.) Powerful professional development is driven by a desire to improve the learning of all students, is based on generally accepted standards for staff development practice, and is part of every teacher's workday.

Staff development goals are determined by reviewing student work and various sources of data, and the success of staff development is measured against the achievement of those goals. High-quality professional learning is based on principles stated in the National Staff Development Council's *Standards for Staff Development* (2001); significant deviations from these principles mean that staff development will have little effect on professional practice and student learning.

The most significant professional learning will occur each school day as teachers work with one another to plan more effective lessons, critique student work to determine ways learning can be improved, and discuss common problems of teaching. More specifically, high-quality professional development:

- Uses information related to student learning to determine staff development goals, promote teacher learning, and evaluate the effectiveness of staff development efforts.
- Focuses on a small number of student learning goals.
- Matches adult learning processes with the intended learning outcomes for students and the desired instructional practices of teachers.
- Deepens teachers' knowledge of the content they teach.
- Engages teachers in the continuous improvement of their teaching and expands the repertoire of instructional approaches they use to teach that content to an increasingly diverse student population.
- Engages teachers in the regular study of student work.
- Provides extensive classroom support to teachers in the form of coaching, mentoring, and demonstration lessons.
- Offers programs that support beginning teachers and principals and provide intensive assistance to veteran educators who are experiencing difficulty.

The materials within *By Your Own Design* cover the subject of quality professional learning extensively, as does National Staff Development Council's *Standards for Staff Development, Revised Edition* (2001).

## 3.) Individuals can make a profound difference no matter what their position in the organization, and the change process begins with them.

Most experts agree that formal educational leaders, such as principals and superintendents, have positions that enable them to make significant differences in their organizations. But it has not been as widely recognized that the most profound changes begin with the individual.

Kegan and Lahey (2001) argue for the importance of personal change in leaders: Leading involves trying to effect significant changes; these changes are hard to bring about without changing individual behavior; it is hard to sustain changes in individual behavior without changes in an individual's underlying meaning that gives rise to the behavior; and it is very hard to lead others to change without leaders considering the possibility that their behavior must also change.

While the influence of formal leaders cannot be underestimated, Robert Quinn (2000) recognizes the power of transformational leadership and the impact that individuals in all positions can have on those around them and on the organization. "We can each become transformational change agents," he writes. "We do not need to be world leaders, leaders of an organization, or even the head of a family to do this. Each of us can make a significant contribution to positive change in ourselves, our relationships, and in any organization or culture in which we take part. . . . Transforming a human system usually requires that we transform ourselves, and this is a key to the process" (pp. 3-4).

How does that produce change in others? "My new behavior distorts the balance or equilibrium...," Quinn (2000) writes. "New patterns of behavior usually only occur when I, the change agent, have a new viewpoint and a new purpose" (p. 201). "The transformational change agent says, 'Here is the standard, which I know is impossible, so let's stand together and learn our way into a higher level of performance'" (p. 164).

## Implementing Deep Change

Teachers and administrators must also choose between slow death and deep change. Slow death—a place of comfort and habit that may lead to anger and depression—is especially common in "don't rock the boat" cultures, Robert Quinn (1996) observes. "Slow death," he writes, "is the devil we know, so we prefer it to the devil we do not know" (p. 24). It is characterized by denial, dishonesty, a lack of vitality, and a focus on staying busy rather than doing the right thing.

"Deep change," Quinn writes (1996), "differs from incremental change in that it requires new ways of thinking and behaving. It is change that is major in scope, discontinuous with the past, and generally irreversible. The deep change effort distorts existing patterns of action and involves taking risks" (p. 3). Individuals who undergo such change, he argues, ". . . are master change agents capable of making deep change in themselves, in their relationships, and in their organizations" (p. 12).

Quinn (1996) says that such changes in individuals can lead them to become potent change agents. "When we have successfully experienced a deep change, it inspires us to encourage others to undergo a similar experience. We are all potential change agents. As we discipline our talents, we deepen our perceptions about what is possible," he writes (p. xiii).

## Teacher-Principal Relationships

Relationships among adults within schools also affect professional learning. Roland Barth (2001) describes relationships within schools as too often being "independent and isolated, or adversarial and competitive" (p. 157).

He also notes, ". . .the relationship among the adults in the schoolhouse has more impact on the quality and the character of the school—and on the accomplishment of youngsters—than any other factor. . . . Among adult relationships in schools, that between teacher and principal is decisive. I have found no characteristic of a good school more pervasive than healthy teacher-principal relationships. . ." (p. 105).

Relationships in schools are often described as patriarchal, with an uneven distribution of power and a view that teachers and principals require "remediation" by district leaders, consultants, and researchers who know more than they do. Teachers and principals are seldom seen as truly equal partners who are capable of making significant contributions to reform and meaningful engagement in inventing solutions rather than simply being recipients of directions and the wisdom of others.

## Creating Solutions in Concert

Professional learning is most powerful when it takes place in a community that is deeply committed to common goals and to sustaining new practices when those methods meet the inevitable challenges of implementation. Principals and teacher leaders play critical roles in this process. Most important among those roles is nurturing in other staff members a belief in their capacity to do what has never before been done—educate all students to high levels of performance.

Leaders are most successful in assisting others in creating that which may initially seem impossible when they stand with others as equals and partners in the process of inventing solutions to the common problems they face. People feel most alive and committed to significant change when they create things about which they care. Ownership and sustained energy during the change process comes from meaningful participation in creating that which would not exist without the intention and effort of the creators. Another benefit of this creative process is development of shared meaning, a quality many experts deem critical to a successful change process.

Too often, educators have become dependent on outsiders and, as Barth (2001) expresses it, masters of the question, "What am I supposed to do?" (p. 3). "Our profession desperately needs school-based reformers," Barth argues. "A school-based reformer is an educator who works in the school and is seldom heard to say, 'They'll never let us,' and seldom asks, 'What am I supposed to do?'" (p. 5).

## Joy That Comes from Caring and Creating

Peter Senge and Robert Quinn provide another perspective about the capacity of educators to make improvements.

Senge believes that willingness to change is heightened when educators slow down to identify what they really care about and want to create (Sparks, 2001a). "What I mean by creating is directing our energies into bringing things into reality that we really care about . . .," he says. "Most situations in life don't have a single right answer. Instead, there are more effective and less effective actions. In my experience, the most effective actions arise when we live the question, 'What do we want to create?' This is not all that matters—we also need ideas about how we can move forward. But vitality comes when we move in the direction of what we truly want to bring into reality. The key to all this is really pretty simple—believing that every person has the capacity to create" (pp. 45-46).

Quinn expresses it this way: "Our greatest joy no matter what our role comes from creating. In that process people become aware that they are able to do things they once thought were impossible. They have empowered themselves, which in turn empowers those with whom they interact" (Sparks, 2001b, p. 50).

As you create new possibilities for your students, it is our intention that the information provided here stimulates your intellect, provides practical strategies for improvement, and nurtures your belief in the capacity of all students and staff members to learn and perform at high levels. That is our aspiration and the standard of success against which our efforts must be judged.

*Dennis Sparks is executive director of the National Staff Development Council and is the author of several books and articles on trends and issues in staff development.*

**References**

Barth, R. (2001). *Learning by Heart.* San Francisco: Jossey-Bass.

Fritz, R. (1989). *The Path of Least Resistance.* New York: Fawcett Columbine.

Kegan, R. & Lahey, L. (2001). *How the Way We Talk Can Change the Way We Work: Seven Languages for Transformation.* San Francisco: Jossey-Bass.

Lee, V. & Loeb, S. (2000). School Size in Chicago Elementary Schools: Effects on Teachers' Attitudes and Students' Achievement. *American Education Research Journal, 37* (1), 3-31.

National Staff Development Council. (2001). *National Staff Development Council's Standards for Staff Development, Revised Edition.* Oxford, OH: Author.

Quinn, R. (1996). *Deep Change: Discovering the Leader Within.* San Francisco: Jossey-Bass.

Quinn, R. (2000). *Change the World: How Ordinary People Can Accomplish Extraordinary Results.* San Francisco: Jossey-Bass.

Senge, P., Cambron-McCabe, N.H., Lucas, T., Smith, B., Dutton, J. & Kleiner, A. (2000). *Schools That Learn.* New York: Doubleday.

Sparks, D. (2000). Low Incomes, High Hurdles: An Interview with Kati Haycock. *Journal of Staff Development, 21* (3), 37-40.

Sparks, D. (2001a). Why Change Is So Challenging for Schools: An Interview with Peter Senge. *Journal of Staff Development, 22* (3), 42-47.

Sparks, D. (2001b). Change: It's a Matter of Life or Slow Death. An Interview with Robert Quinn. *Journal of Staff Development, 22* (4), 49-53.

# Taking on Loneliness

This school superintendent urges teachers to overcome the isolation inherent in their profession by forming true learning communities.

**by Rick DuFour, Adlai Stevenson High School District 125, Lincolnshire, Illinois**

One of the most formidable obstacles a school will face in attempting to function as a professional learning community is the tradition of teacher isolation that has represented the norm in most schools.

Despite the unceasing waves of reforms that have washed upon public schools, in the final analysis, teaching has continued to be characterized by a single adult, standing alone before 25 children, and working in isolation. Mike Schmoker's reflection on his experience as a high school English teacher (1996) rings true for many teachers throughout North America. He wrote:

> *The crush of ... our myriad daily events and duties kept us from collaborating on such obvious and challenging concerns as how to teach composition more effectively, how to conduct discussions about literature more effectively, and how to make literature more exciting. We did not know if or how anyone was teaching composition--or even what that meant. So we worked, consciously or unconsciously toward our own goals, within the limitations of what each of us knew or did not know. Day-to-day concerns kept us from reflecting on what our most important goals should be.*

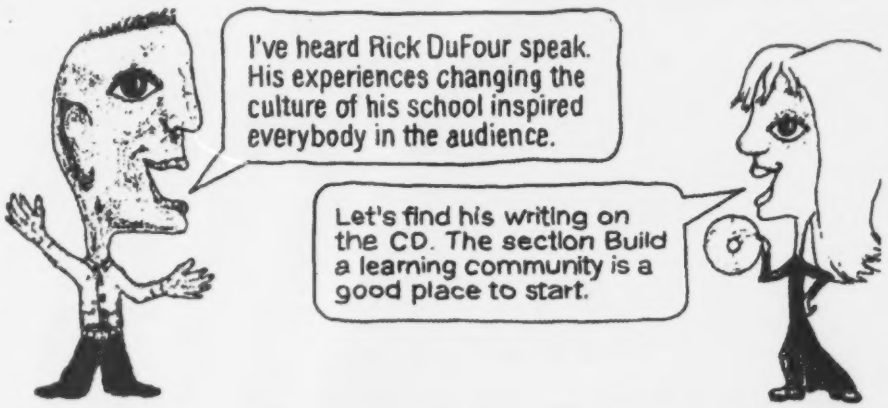
Few educators argue with the characterization of teaching as the "lonely profession." Separated by their isolated classrooms and tightly packed daily schedules, they seem resigned to the fact that they rarely work with colleagues on matters related to teaching and learning.

This traditional structure and culture of teacher isolation stands in sharp contrast to the collective inquiry, reflective dialogue, and collaborative culture of the professional learning community. Thus, it's not surprising that creating a collaborative environment has been described as "the single most important factor" for successful school improvement initiatives, and "the first order of business" for those seeking to enhance the effectiveness of their schools (Eastwood & Louis, 1992).

The growing recognition of the need to replace the traditional norm of professional isolation with a more collaborative environment has led some schools to reorganize faculty into teaching teams. This is clearly a step in the right direction. Teams have been described as "the basic building block of the learning organization" (Pinchot & Pinchot, 1993), "the essence of a learning organization" (Dilworth, 1995), and a "critical component of every enterprise—the predominant unit for decision making and getting things done" (Senge, 1994).

Advocates for collaborative team structures in schools cite a host of benefits showing that teams:

- Enable teachers to test their ideas about teaching and expand their level of expertise by allowing them to hear the ideas of others (Wildman & Niles, 1987);
- Help to reduce the fear of risk taking by providing encouragement and moral support (Fielding & Schalock, 1985);
- Can be linked to gains in achievement, higher quality solutions to problems, increased confidence among all members of the school community, more systematic assistance to beginning teachers, and an increased pool of ideas, materials, and methods (Little, 1990);
- Reinforce changes in school culture and commitment to improvement initiatives (Klein, et al., 1996); and
- Foster better decisions and increase the likelihood of ownership in the decisions (Dillon-Peterson, 1995).

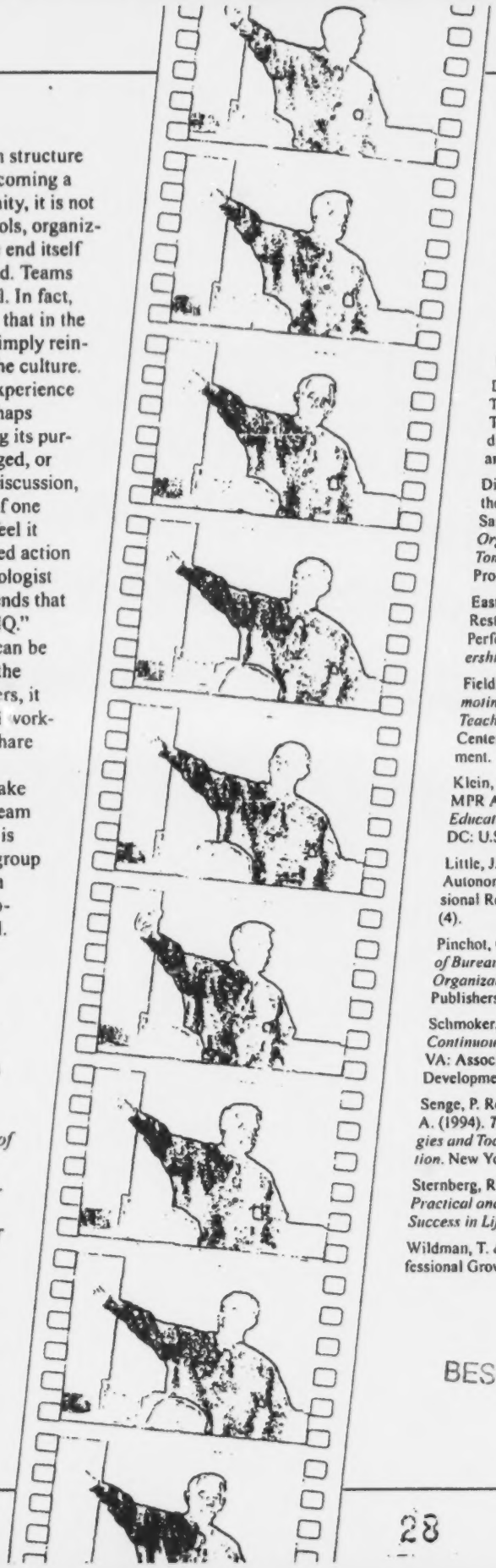

I've heard Rick DuFour speak. His experiences changing the culture of his school inspired everybody in the audience.
Let's find his writing on the CD. The section Build a learning community is a good place to start.

But while moving to a team structure may be a necessary step in becoming a professional learning community, it is not a sufficient step. In some schools, organizing into teams has become the end itself rather than the means to an end. Teams themselves are morally neutral. In fact, there is considerable evidence that in the wrong school culture, teams simply reinforce the negative aspects of the culture.

Most adults have had the experience of being on a "bad" team. Perhaps the team was unclear regarding its purpose, or hidden agendas emerged, or an individual dominated the discussion, or members were untrusting of one another, or the group did not feel it had the authority to take needed action after making decisions. Psychologist Robert Sternberg (1996) contends that such groups have low "group IQ." He argues that while a group can be no "smarter" than the sum of the strengths of individual members, it can be "dumber" if its internal workings don't allow members to share their talents.

Schools make a major mistake when they settle for creating team structures. The real challenge is developing teams with high "group IQ," teams that are effective in working together to solve problems and to renew their school. We cannot settle for merely creating team structures. We must work to address the challenge of developing high-performance teams that are focused on essential questions of teaching and learning.

*Rick DuFour, superintendent of Adlai Stevenson High School District 125, Lincolnshire, Illinois, is also a well-known writer and speaker. Several of his articles are available on the CD-ROM,* By Your Own Design: A Teacher's Professional Learning Guide *in this issue of* ENC Focus. *Email: rdufour@district125.k12.il.us*



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**References**

Dillon-Peterson, B. (1995). Trusting Teachers to Know What Is Good for Them. In: *Improving Teachers.* Alexandria, VA: Association for Supervision and Curriculum Development.

Dilworth, R. (1995). The DNA of the Learning Organization. In: C. Sarita and J. Renesch. eds. *Learning Organizations: Developing Cultures for Tomorrow's Workplace.* Portland, OR: Productivity Press.

Eastwood, K. & Louis, K. (1992). Restructuring that Lasts: Managing the Performance Dip. *Journal of School Leadership, 2* (2).

Fielding, G. & Schalock, H. (1985). *Promoting the Professional Development of Teachers and Administrators.* Eugene, OR: Center for Educational Policy and Management.

Klein, S., Medrich, E., Perez-Ferreiro, V. & MPR Associates (1996). *Fitting the Pieces: Education Reform That Works.* Washington, DC: U.S. Government Printing Office.

Little, J. (1990). The Persistence of Privacy: Autonomy and Initiative in Teachers' Professional Relations. *Teachers College Record, 91* (4).

Pinchot, G. & Pinchot, E. (1993). *The End of Bureaucracy and the Rise of the Intelligent Organization.* San Francisco: Berrett-Koehler Publishers.

Schmoker, M. (1996). *Results: The Key to Continuous School Improvement.* Alexandria, VA: Association of Supervision and Curriculum Development.

Senge, P. Ross, R. Smith, B. Roberts, C. Kleiner, A. (1994). *The Fifth Discipline Fieldbook: Strategies and Tools for Building a Learning Organization.* New York: Doubleday.

Sternberg, R. (1996). *Successful Intelligence: How Practical and Creative Intelligence Determine Success in Life.* New York: Simon & Schuster.

Wildman, T. & Niles, J. (1987). Essentials of Professional Growth. *Educational Leadership 44* (5).

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# Learning to Use Data to Get Results

The Central Ohio TIMSS Collaborative is bringing school districts together to help educators learn to use data to improve student achievement.

**by Pat Barron and Cathy Behrends, Science & Mathematics Network, Columbus, Ohio, and Jennifer Feeney, Hilliard, Ohio, School District**

It was 8 am on a beautiful June morning, and 60 classroom teachers and school administrators from eight central Ohio school districts had already arrived for our meeting at ENC's headquarters, ready to get to work. As we greeted them, helped them connect with colleagues from their districts, and introduced them to their counterparts from other districts, we noticed that their eyes kept turning to a table laden with stacks of four-inch notebooks, filled with thick layers of multicolored paper.

The notebooks contained the reason for the meeting: data. The educators had come to spend the next two days analyzing:

- the March 2000 scores of their districts' students on Ohio's fourth-, sixth-, and ninth-grade proficiency tests in mathematics and science;
- a student survey—elementary, middle school, and high school students' perceptions of instructional practices in their mathematics and science classes and their opinions about mathematics and science;
- a teacher survey—elementary, middle school, and high school mathematics and science teachers' reports of their own instructional practices and their opinions about their preparation and professional development;
- a curriculum survey—a list of the mathematics and science curriculum materials used in each school district.

We knew that all of the educators at the meeting were keenly aware of their districts' past performance on the state proficiency tests, but this meeting, sponsored by the Central Ohio TIMSS Collaborative, was planned to help them look at the numbers in greater depth. The proficiency test scores had been disaggregated (broken down) by math and science content strand, gender, and ethnicity. Details of results from all the participating districts were in the notebook ready to be analyzed. The student, teacher, and curriculum surveys added information that helped put the proficiency test scores in context.

## The Authentic Task Approach to Planning

The Science & Mathematics Network described in the accompanying article was just one of ten organizations sending a total of 100 leaders in mathematics and science education to ENC's Authentic Task Approach (ATA) Institute in October 2000. Institute participants worked on a real problem, or authentic task, chosen by their organizations. The Institute also helped participants understand the principles of high-quality professional development by serving as a model.

Pat Barron, Cathy Behrends, and Jennifer Feeney explain how their participation in the ATA Institute contributed to the work of the Central Ohio TIMSS Collaborative:

> One benefit of the ATA Institute for us was that it provided uninterrupted time for our staff to work on this one task with the support of ENC staff and resources. For example, the ENC collection contained examples of student and teacher surveys that we could adapt for our use. (The CD-ROM accompanying this magazine contains sample surveys and information about data analysis. See the Build a Foundation section and choose Analyze Student Data.)
>
> A unique part of the ATA plan was bringing experts from all over the country to serve as resource persons for Institute participants. The decision on which experts to invite was based on the needs expressed ahead of time by the attendees. Because we had informed ENC we were interested in ways educators can look at data, Mark Kaufman of the Northeast Eisenhower Regional Consortium at TERC presented a workshop on use of Nancy Love's book *Using Data/ Getting Results* (2002), an early version of which had just

been released at the time of the ATA Institute. A table summarizing Examples of Useful Data (see p. 28) and a list of the Top Ten Ways to Use Data for Change (see p. 29) are just two examples of the useful information we gained from this book

Another benefit of the ATA Institute was the opportunity for informal networking with participants who had come from all over the country. Our experiences meeting other ATA participants confirmed our belief that teachers and administrators from one district would greatly benefit from a meeting that included educators from other districts, even if each group was focusing primarily on the data and needs of its own district.

The ATA model emphasizes the need for each group to be led by facilitators who are not part of the group. Our experience at ENC's Institute convinced us that we wanted that kind of support for the educators who would be analyzing the data we planned to collect.

Other organizations sending members to the Institute included National Staff Development Council (NSDC), Association of State Supervisors of Mathematics (ASSM), National Science Education Leadership Association (NSELA), National Council of Supervisors of Mathematics (NCSM), and Eisenhower Regional Consortia for Mathematics and Science Education, as well as educational leaders from the state of Ohio and local school districts.

ENC offered the ATA Institute with the assistance of Learning Innovations, a division of WestEd based in Stoneham, Massachusetts, that pioneered the approach. For more about the ATA Institute, see page 9 and access the Learn More section of the CD-ROM provided with this magazine.

Just as important as the data itself were two full days of time to analyze it and the guidance that the educators would receive from facilitators from our organization, the Science & Mathematics Network, and from ENC. These teachers and administrators not only would have access to a vast quantity of data, but they would also plan how to use it to get results.

## The Central Ohio TIMSS Collaborative

The Central Ohio TIMSS Collaborative was founded in 2000 by superintendents of nine area school districts. The mission of the Collaborative is to help participating districts reach world-class standards in mathematics and science by using learnings from the Third International Mathematics and Science Study (TIMSS), combined with local data and experience. The Collaborative is modeled on the First in the World Consortium of school districts in the Chicago area. (An article about the success of this effort was published in an earlier issue of *ENC Focus*, available online: enc.org/focus/change)

First on the Collaborative's agenda was a baseline study, a systems analysis. The purpose was twofold: to determine the current status of mathematics and science locally and to gather data to help identify the most important areas around which to provide professional development.

Recent research (Love, 2002) has shown that when educators are involved in analyzing data such as those gathered in the baseline study, the conclusions and suggestions for action are much richer than if the data were analyzed by outsiders. This was the rationale for our two-day meeting at ENC.

Planning for the baseline study and the meeting to analyze the results began in another meeting at ENC—its five-day Authentic Task Approach (ATA) Institute, held in October 2000. (See sidebar on page 26.)

## Questions to Guide Data Analysis

The eight months between our planning at the ATA Institute and the Central Ohio TIMSS Collaborative multidistrict meeting was just enough time to gather and organize the baseline data. In fact, we were compiling the notebooks the day before the educators met at ENC. We wanted to give each district group a full day to look at the data in an unstructured way, but we did provide lists of a few questions they could use to guide their thinking.

We suggested that in looking at the proficiency test data, groups might focus on the strands of the mathematics and science content. In which strands did students score highest and lowest, and did that change over fourth, sixth, and ninth grades? In looking at gender differences, we suggested that they again look at changes at the three grade levels.

Our questions for the teacher surveys suggested that participants track the prevailing modes of instruction in their district and see how the modes differ from elementary through high school and between math and science. We urged them to notice teachers' practice in assigning homework and what types of assessment district teachers use most. The surveys asked teachers how prepared they felt to teach various content strands, and we suggested the analysis might track the responses across grade levels and in comparison with student test scores on the various strands.

For the student surveys, our questions focused on student feelings about math and science. How often did students perceive that they were doing the processes of science or math (i.e., collecting data, predicting, drawing conclusions)? Did students' perceptions of the use of group work, computers, and other instructional modes match those described by their district's teachers?

### Examples of Useful Data

- Standardized test results
- State assessment results
- Performance assessment results
- Examples of student work
- Teacher surveys on classroom practice
- Teacher surveys on concerns and needs
- Surveys on student aspirations
- Records of use of science kits or manipulative materials
- Master schedules showing mathematics and science course offerings
- Demographic breakouts of students taking algebra or geometry
- Interviews with teachers, administrators, students, parents
- Demographic breakouts of students participating in mathematics and science clubs
- Checklist of tracking practices
- Mathematics and science classroom observations

From Love, Nancy. (2002). *Using Data/Getting Results: A Practical Guide for School Improvement in Mathematics and Science.* Norwood, MA: Christopher Gordon. p. 27. Used with permission.

## Multiple Ways of Viewing Data

The 60 educators seemed happy enough to have our lists of guiding questions, but their real interest was focused on the thick notebooks full of data. Within minutes, each group was deeply involved in attacking the data in the ways that made sense to that group. Kyleen Calabrese, a fifth-grade teacher in Hilliard, remarked, "I believe that data is the only objective way to obtain results about what works and doesn't work for instruction of our students."

Several groups took a global approach, beginning their analysis by identifying all of the surprising numbers in the data for their districts. Groups from other districts were more analytical: one district immediately decided to rank all the mathematics strands from highest to lowest for fourth and sixth graders in their district. Another district zeroed in on one finding and began to discuss ways to address that problem.

Many groups brought out calculators and began to crunch the numbers further. One group called their district office for more information.

In many groups, the outside facilitator listened intently or took notes on chart paper, but when one group became

*continued on page 30*

## Top 10 Ways to Use Data as a Lever for Change

The following list is excerpted from one published in Nancy Love's book *Using Data/Getting Results: A Practical Guide for School Improvement in Mathematics and Science* (2002, Norwood, MA: Christopher Gordon, pp. 28-30). The ideas are based on the work of the Northeast Eisenhower Regional Alliance for Mathematics and Science Education at TERC. See the book for the original version of the list, which contains detailed examples. That version is also available on ENC's CD-ROM, *By Your Own Design—A Teacher's Professional Learning Guide.*

1. Data can uncover problems that might otherwise remain invisible.

   Not until one district analyzed course enrollment data by racial groups did administrators see that minority students did not take upper-level mathematics courses because they did not have access to "gatekeeper" courses in algebra and geometry.

2. Data can convince people of the need for change.

   Elementary teachers in one district changed their practice after they visited middle and high schools in their district and saw their English-language learners had been tracked into special or bilingual education programs.

3. Data can confirm or discredit assumptions about students and school practices.

   One high school decided to test the assumption that low-achieving students needed remediation in mathematics. They enrolled the students in challenging courses and provided extra support. The students performed better than they had in remedial courses.

4. Data can get to the root cause of problems, pinpoint areas where change is most needed, and guide resource allocation.

   Teachers in one district thought their graduates dropped out of college because of a lack of social skills, and they planned a program to solve that problem. However, a survey of graduates revealed the real cause was poor writing skills.

5. Data can help schools evaluate program effectiveness and keep the focus on student learning results.

   Resisting pressure to jump onto the next bandwagon, one district took time to track student achievement on their new elementary math program. Student success, along with results of teacher surveys, convinced administrators to expand rather than change the program.

6. Data can provide the feedback teachers and administrators need to keep going and stay on course.

   Four times a year, a group of teachers uses a rubric to track their students' problem-solving skills. The teachers celebrate when scores rise and brainstorm strategies when they fall.

7. Data can prevent overreliance on standardized test scores.

   Performance assessments, mathematics and science enrollment figures, information on classroom practice, and other data provide a balanced view of a school's strengths and weaknesses.

8. Data can prevent one-size-fits-all and quick-fix solutions.

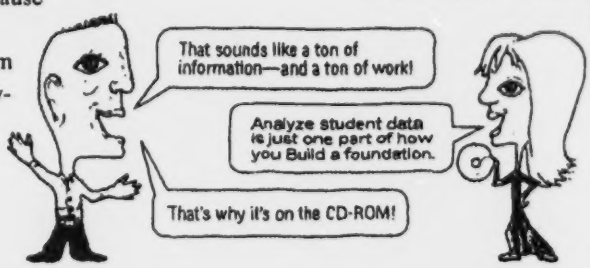
   Buying hands-on science kits for elementary classes may seem like a good idea, but it won't work if surveys reveal that teachers don't feel comfortable with the science content or classroom inquiry.

9. Data can give schools the ability to respond to accountability questions.

   In one state, districts are encouraged to issue progress reports outlining data that inform community members about the performance of their schools.

10. Data can help build a culture of inquiry and continuous improvement.

    People need to be armed with solid data to uncover and understand problems and test solutions. Inquiry based on data is the hallmark of the most successful schools.


That sounds like a ton of information—and a ton of work!
Analyze student data is just one part of how you Build a foundation.
That's why it's on the CD-ROM!

bogged down, the facilitator stepped in to say, "Don't worry about what the groups from other districts are doing. What matters most to you?"

In some cases, how their district compared with the other districts was what mattered. One district administrator shook his head and sighed, "We are number five—all the other districts change places in the different rankings, but somehow we are always number five." Another group noticed that a neighboring district had much higher scores than their district in a particular science strand. Looking at the curriculum survey data, they exclaimed, "Look! They are using that science curriculum we have been considering! Let's talk to them at break."

We had planned to give participants loosely structured time almost the entire first day, and we wondered how comfortable participants would be with that approach. Looking around the conference room, we saw that the facilitated groups were energized by the uninterrupted time. In the late afternoon, when we had expected participants to be tired, we asked a question to refocus them: "Think about what you do not know by looking at these data." The groups plunged into this task with just as much energy as they had shown at 9 am.

## From Analysis to Action

The second day of the meeting was quite different from the first. The morning was spent with each district reporting its findings from the first day. Findings were noted on one of four easel pads: Elementary School, Middle School, High School, or General Findings, so they could be read by everyone. To prepare for the next segment, participants selected three to five findings or issues in each area that were recurring or were the most appropriate for the Collaborative to address.

The whole group was then rearranged along cross-district lines. Participants self-selected to join one of five groups: elementary; middle school; high school; reading, writing, and computers; or general.

During a working lunch, these cross-district groups shared their insights and concerns. Each group used its three to five findings as the basis for a facilitated brainstorming and discussion session. The group examined each finding and suggested professional development activities that the Collaborative could design and implement to address the finding. For example, support for district- and building-level study groups was suggested as a strategy to address the need to increase writing as a part of mathematics. At the end of the period, each of the groups reported its top picks for professional development.

The last few hours of day two were spent planning the next steps for the Collaborative. It was decided that representatives of each district would meet to summarize the key findings of the cross-district groups and to prioritize their recommendations. Based on that review, the representatives would develop a plan to present to the district superintendents for implementation. Meanwhile, the district groups would continue to meet, and many groups took a few moments to plan exactly when and where that would take place.

Catherine Schulte, curriculum leader for K-12 mathematics and science in Canal Winchester, spoke for many administrators in hoping that teachers would continue to be involved in the effort, "It is not enough for administrators to have access to the data. Making it relevant for teachers in order to impact instruction should be our goal. Hopefully, we will be able to provide professional development to support teachers in this task."

Ken Pease, a fourth-grade teacher, summarized the conclusions of the group from the South-Western City School district, who saw significant changes coming from the effort: "We feel once trends (strengths and weaknesses) are noticed in data, we can supplement and modify instruction, curriculum, and staff development appropriately."

## Reflecting on Their Learning

The afternoon of the second day was also a time for reflection on the process of data analysis and on how data can be used to get results.

According to Pam Patterson, third-grade teacher in Grandview Heights, Ohio, "There are so many factors/variables involved in children's development. Using data helps to narrow the focus so educators, parents, and students can better meet the need for educational improvement."

All of the participants had seen student test results before, but the student and teacher surveys put those numbers in a new context. "This is the first time, that I know of, where I have seen survey data from students and teachers. I always thought I knew how my students and colleagues thought and felt about their learning and instruction. Now I have some 'real' data," said Beverly May, a high school teacher from Westerville, Ohio.

"I think that the surveys are a wake-up call. We need to organize meaningful staff development and highly encourage our teachers to buy in," said Julie Hedrick, a sixth-grade teacher in the South-Western district.

Ann Carlson, K-12 mathematics coordinator in Westerville, appreciated the opportunity to bring together teachers from all parts of her district, "Mixed grade-level teams meet to talk and analyze points, but there is a lack of communication from elementary through high school. People tend to only know what's going on in the division in which they work. Much of the knowledge of other divisions is rumor. Data facilitate conversation."

Other participants recognized the value of time spent on data analysis. According to Susan Witten, director of curriculum and professional development in the Hamilton Local district, "Having focused time to examine the data for trends and patterns will help move our continuous improvement efforts forward. The challenge is finding time and a means to engage our staff in a similar process so that the findings are real and meaningful."

Photo courtesy of Summer Math for Teachers

## Notes of Caution

While the overriding feeling of the participants was one of success, they also knew they had a long way to go. Cathy Bell, a high school mathematics teacher from Grandview Heights, spoke for many when she said, "I think that what we have done is just the start—I would hesitate to draw conclusions based on one year's data. But it made me aware of some areas that need further study or clarification."

Sheree Daily, an eighth-grade mathematics teacher in Canal Winchester, agreed, "Data provide a jumping off point. You must evaluate data in context with your district history, environment, and future plans for improvement. Data can be used to further promote your plans. It can also help you see changes that should be made in those plans."

Missy Gordon, facilitator of intervention services, K-12, in Upper Arlington, took a broad view: "Data must drive improvement efforts in all institutions and businesses. It is the only way to measure the effectiveness of what we do everyday. The critical element is collecting the 'right' data—those which actually inform us about our work."

With the enthusiasm and wisdom we observed in the teachers and administrators who attended the two-day meeting of the Central Ohio TIMSS Collaborative, we feel great confidence as we plan the next steps for the group. We are more convinced than ever that districts working together can lead to real educational improvement for all of our communities.

*Pat Barron is executive director of the Science & Mathematics Network, an education-oriented, nonprofit organization that coordinates the Central Ohio TIMSS Collaborative. She was formerly a middle school science teacher and science coordinator in Worthington, Ohio.*

*Cathy Behrends is the assistant director for the Network, where her responsibilities include development, communications/marketing, and project coordination.*

*Jennifer Feeney, formerly a middle school mathematics teacher in Westerville, Ohio, served as a professional development coordinator for the Network for six years. She is currently employed by the Hilliard, Ohio, School District.*

**References**

Continuing to Learn from TIMSS Committee. (1999). *Global Perspectives for Local Action: Using TIMSS to Improve U.S. Mathematics and Science Education.* Washington, DC: National Academy Press. (www.nap.edu/html/using_timss)

Love, Nancy. (2002). *Using Data/Getting Results: A Practical Guide for School Improvement in Mathematics and Science.* Norwood, MA: Christopher Gordon.

Richardson, Joan. (November/December 2000). The Numbers Game: Measure Progress by Analyzing Data. *Tools for Schools.* (www.nsdc.org)

# Even Better Than Face-to-Face?

An online professional development course gives participants the courage to step out of their comfort zone to examine gender equity issues and to try suggestions for classroom action.

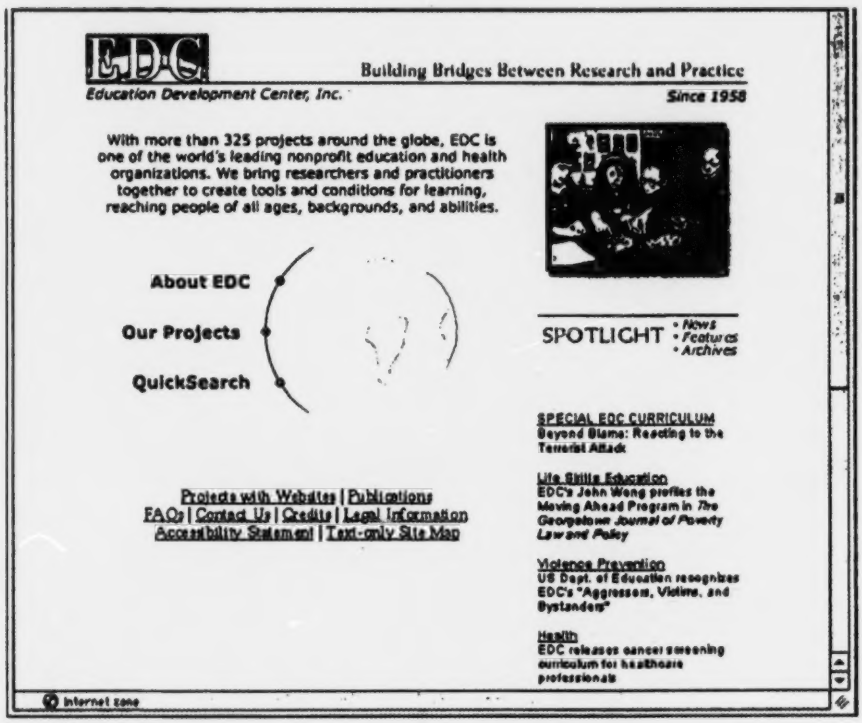
**by Judy Spicer, ENC Instructional Resources**

During the spring of 2001, I facilitated an eight-session online professional development course, Engaging Middle School Girls in Math and Science. Developed by the Women's Educational Equity Act (WEEA) Equity Resource Center, the course is available for a fee on the Equity Online web site (www.edc.org/WomensEquity). The course offers strategies for creating classroom environments in middle schools that support girls' success in math and science, and thereby improve instruction for all students.

As described on the web site, participants in the sessions I facilitated:

- explored the unconscious biases into which we are socialized and that permeate instructional practice;
- examined hidden gender-based assumptions in math and science curricula;
- considered good instructional practice that attends to the unique needs of students who are girls of color, English language learners (ELL), and girls with disabilities;
- investigated resources that help teachers be more inclusive in their representation of good math and science; and
- learned how to build family and community support that values girls' success in math and science.

In each of the eight sessions, teachers were asked to read through online material that included research-based information and case studies. Then they were to try at least one of the suggested classroom activities and report on the results by entering the online discussion at least three times. Another course requirement was preparation of a final presentation, or new activity, to share with other participants at the end of the course. Course developers expected that participation in the course would average about three hours per session. The suggested activities were designed to be integrated into each teacher's own classroom plans.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## Free to Take a Risk

From my experience, quality professional development takes teachers out of their comfort zone and empowers them to take a risk. The out-of-comfort-zone experience for the participants in this course

involved raising their awareness about gender equity issues and offering suggestions for action. The teacher participants took risks by examining their familiar teaching practices in terms of gender equity and then making changes in situations where gender issues may not have been obvious but were roiling beneath the surface of the classroom.

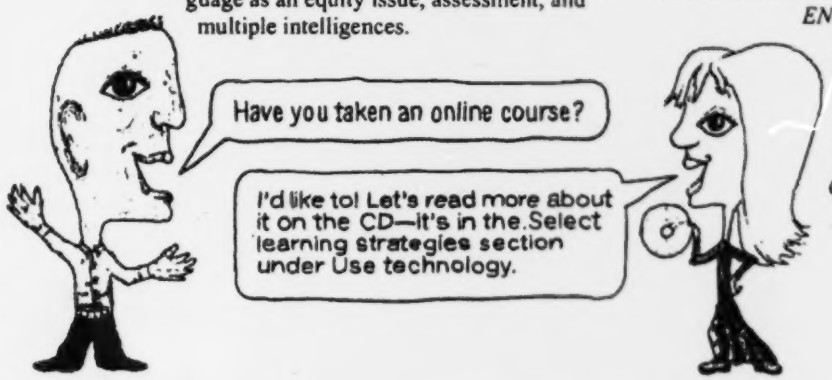
I believe the online nature of the discussion in the Engaging Middle School Girls in Math and Science course was particularly beneficial for this emotion-laden topic. It enabled participants to be more descriptive and freer with ideas than they might have been while interacting in more traditional, face-to-face professional development programs.

The course readings immediately ignited interest by asking participants to reflect on and share their earliest memories of the math or science classroom. Many participants had never realized how those experiences affected their abilities and beliefs about learning math or science.

Next, participants examined their current teaching situations and reflected on ways to engage all students in math and science. Online discussions began with questions based on the readings and case studies. Teachers' eyes were opened as they dealt with questions such as these:

- When considering "what is good science" or "what is good math," is there any difference in who is asking the question? Or in who is answering the question? Is good math or science the same for everyone?
- What expectations do you think your students have for each other with respect to participation and success in math and science activities?
- What do you envision when you say "more parental involvement in education"? Have you ever been in the "parent" role when talking to a teacher? Does this feel different than when you are the teacher talking to a parent?

Other threads for reading and discussion included language as an equity issue, assessment, and multiple intelligences.


Have you taken an online course?
I'd like to! Let's read more about it on the CD—it's in the Select learning strategies section under Use technology.

## Other Benefits of Online Professional Development

One of the most commonly mentioned benefits of online professional development is that it allows participants to pick the time when it is most convenient for them to participate. This was certainly a factor in teachers' willingness to participate in the WEEA course.

However, during the course, I was most impressed with how effective the Internet is for providing a forum for thoughtful dialogue and for creating a sense of sharing and support among participants. Online professional development offers one possible remedy to the common teacher feelings of isolation and inadequacy. Our electronic discussions exploring gender equity were candid and supportive for the teacher participants.

Participants also appreciated the timely nature of the feedback offered by their peers. Teachers reported that the value of this course was that it had them carefully look at their classroom practice in terms of gender equity and raised their awareness on a day-to-day basis. The participants had time to candidly discuss and work together through classroom situations that did not always develop as planned.

Teachers who took the course when I facilitated it are looking forward to being part of an ongoing network of course graduates from across the country. The network will provide a support community for teachers working to make classrooms equitable for all students.

People are often concerned that online professional development might not meet the definition of high-quality professional development—relevant content offered in a sustained experience with active learning by participants. Those characteristics were certainly present in WEEA's Engaging Middle School Girls in Math and Science course. I believe that the range of needs and opportunities for professional development is wide, with a place for all types of experiences. The Internet offers an extremely valuable addition to the list of possibilities.

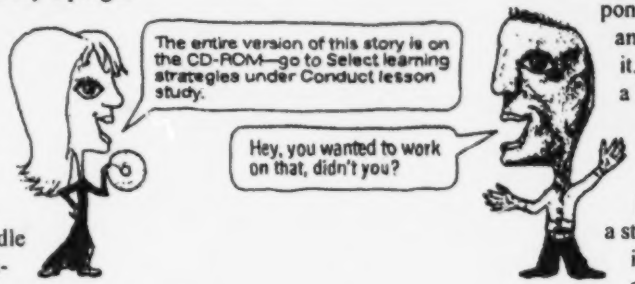
*Judy Spicer is a former high school mathematics teacher who now serves as senior mathematics abstractor for ENC. Her involvement in the online course described in this article was part of an Education Development Center (EDC) research project investigating teacher attitudes as a result of online professional development. The WEEA Equity Online web site offers the course for a fee (www.edc.org/WomensEquity/coursead.htm).*

# Creating Happy Memories

Teachers are building—and sharing—their wisdom and know-how through lesson study. In the process, they're creating memorable learning experiences for students, and for each other.

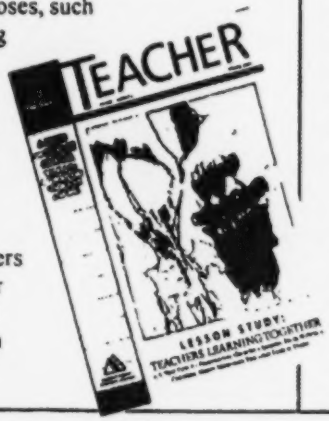
**by Denise Jarrett Weeks, Northwest Eisenhower Regional Consortium for Mathematics and Science**

Every year, math class seems to hum along for eighth-graders at Tillicum Middle School in Bellevue, Washington. They zip right through data collection, graphing, and manipulating variables. But just as spring promises warmer breezes, pupils and teachers can find themselves caught in the annual doldrums you might call the Bermuda Triangle of middle school math: linear relationships.


The entire version of this story is on the CD-ROM—go to Select learning strategies under Conduct lesson study.
Hey, you wanted to work on that, didn't you?

Linear relationships are, perhaps, the most important functions students study in algebra, yet they can be tough for young learners. While students might sail through the concrete aspects of linear relationships—such as coordinate graphing—their understanding often lags when confronted with the more abstract concept of $y = mx + b$, the slope-intercept equation.

Teacher Judy Thiel, a 16-year veteran math teacher in the Bellevue School District, longed for a better way to teach this essential lesson. Despite its abstract form, it's an application that has many real-world purposes, such as modeling data or comparing rates of change. Last fall, when she and three other teachers got together for the first time to do a lesson study, the teachers tossed around several ideas for the focus of their study, but $y = mx + b$ seemed the best candidate for improvement.




The teachers started their lesson study by creating a "mind map," a chart of all the essential ideas students needed to understand the slope and y-intercept concept. "For me, that was an incredible eye-opener," recalls Thiel. "When I saw all of those things on that page that these kids had to master to develop the understanding of $y = mx + b$, I said no wonder they don't get there!"

Even for this master teacher, the best way she knew how to get through the unit, before today, was to "crank and grind" through the components of linear relationships and hope students would get it. After grappling with it in a lesson study, she sees new ways to teach this important concept. Now, she organizes and plans her lessons differently, building a stronger foundation for learning by anticipating students' approaches. She pays closer attention to the details—the smaller components of a lesson as well as those subtle misconceptions that can stump a student. She's more creative in how she gets the fine points across to all students, using varied strategies to support their learning. She also breaks ideas down and stays on those ideas longer because she's more in tune with each student's understanding.

In the process, she's found her own knowledge of mathematics deepening.

"You learn the math along the way," she says. "You also see how all the pieces fit together, step by step by step. I teach everything a little more solidly, I feel."

## Transforming Teaching

Lesson study gave Thiel and her teammates the time to look closely at the lesson as it was presented in the district's middle school textbook, *Connected Mathematics Project*. They also delved into the equation itself and the many ways students could approach it. They incorporated an interactive computer lab activity they found on ExploreMath.com that

This article is excerpted from *Northwest Teacher*, a journal devoted to rigorous and imaginative learning published by the Northwest Eisenhower Regional Consortium for Mathematics and Science. The article comes from the Spring 2001 issue on the topic Lesson Study: Teachers Learning Together. You can find the full text of the issue on the CD-ROM included in this magazine or by visiting *ENC Focus* online at enc.org/focus/pd and following the link from this article.



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roused students' enthusiasm while providing visual reinforcement of y = mx + b, and they developed materials and activities to support learning all along the way. The experience changed everything.

For Thiel, the lesson study focus transformed a difficult unit into one in which she and her students could succeed and have fun. "I was much more relaxed and my students a lot less frustrated. Their scores were higher, but more than that, their attitude was just so much better," she says. "To a teacher, what makes you frustrated sooner than anything else is if you've taught something to the best of your ability and the kids don't understand it."

The experience also changed the way these four teachers work with each other. Now, Thiel and fellow Tillicum math teacher Liz Jones regularly share materials. When one of them writes a supplemental worksheet or activity, she will slip it under the other's door—the welcome token is almost always put right to use.

"One of the things that we realized," says Jones, "is we taught the whole unit better. It wasn't just about one lesson. We were able to share ideas and compare notes from about six weeks' worth of material, which is so rich. That never happens!"

Two other teammates brought special points of view that enriched the whole group's thinking about learning and teaching. Barb Diesel-Hoover is a special education teacher for the district and Steve Lelievre teaches math at Robinswood Middle School, the district's alternative school. Their insights and suggestions for adapting instruction for special-needs students—learning disabled students as well as those who are talented and gifted—have been invaluable, say Thiel and Jones.

## In It for the Long Run

A triathlete in her off hours, third-year teacher Liz Jones knows how to go the distance. Last fall, when the superintendent of the Bellevue School

## The Lesson Study Process

In Japanese schools, the lesson study process generally flows through the following phases. The amount of time devoted to each lesson study varies, but the teachers commonly work on a lesson for about one month. This overview of the process is based on the work of Lewis (2000), Stigler & Hiebert (1999), and Yoshida (1999).

**1. Focusing the Lesson**

The lesson study usually focuses on a broad, schoolwide goal such as "independent thinking" or "love of learning." The teachers help determine these broad goals, and they choose the specific topic of the lesson. The topic often comes from a problematic concept that the teachers have observed in their own classrooms.

**2. Planning the Lesson**

The teachers research the topic of the study, reading books and articles about the problem they are working on. They collaborate to develop the lesson plan, and a draft is presented to the school staff for feedback.

**3. Teaching the Lesson**

One teacher from the team presents the lesson in his classroom. The other teachers observe the lesson very closely, taking notes on what the students and the teacher are doing and saying. The lesson may be documented through video, photographs, audiotapes, and student work.

**4. Reflecting and Evaluating**

The group meets after school to discuss the lesson and their observations. The teacher who presented the lesson speaks first, outlining how he thinks the lesson went and identifying problems he observed. The other teachers contribute their own observations and suggestions.

**5. Revising the Lesson**

Based on the problems identified in the first presentation, the study group makes changes in the lesson. Changes are usually based on student misunderstandings that the teachers noticed during their observation. The group may meet several times to improve the lesson and prepare for a second implementation, although sometimes the teachers decide that they do not need to reteach it.

**6. Teaching the Revised Lesson**

The lesson may be presented again to a different group of students. The same person may teach the lesson a second time or a different teacher may try it out. Often, all the teachers in the school are invited to observe the revised lesson.

**7. Reflecting and Evaluating**

The whole faculty will participate in the second debriefing session, which may cover more general issues of learning and instruction. There is usually an outside expert working with the lesson study group, who speaks last during the debriefing.

**8. Sharing Results**

Teachers share the lessons they develop through this process, creating a bank of meticulously crafted lessons to draw upon. The teachers will often publish a report about their study, including the teachers' reflections and a summary of group discussions. In addition, teachers from outside the school may be invited to observe the teachers present the lesson.

District initiated lesson study districtwide, Jones stepped right up to the challenge, volunteering to be a lesson study leader for her school. Yet, lesson study tested her in unexpected ways. In lesson study, she discovered, it's not about crossing the finish line, it's about the run itself.

"I'm a product person as opposed to a process person. It's a stretch for me to spend so much time on one topic. As teachers, the demands are incredible to get through the material. It's been a good lesson in patience for me," she says, laughing. "I've really come to appreciate the process."

Like many others in her district, Jones has read *The Teaching Gap*, a slim volume describing Japan's approach to lesson study and suggesting how it can be introduced in U.S. schools.

"In the Japanese model, they might take years before even coming up with a [finished] lesson," says Jones. "My Western response to that is, Oh yeah, right! That's an extreme difference in our cultures that I don't think we can collapse in our first experience with this." As a lesson study leader, she feels an obligation to help her group produce well-developed lessons within weeks.

Researcher Catherine Lewis encourages teachers to also pay attention to other valuable outcomes of lesson study. In Japan, lesson study is used to create memorable lessons and a supportive classroom community, she says. "When you ask Japanese elementary teachers, 'What's your most important job?' they say things like, 'My job is to create happy memories.'"

Creating good memories and learning experiences for students is no less important to U.S. teachers, despite immense pressure to cover a broad curriculum and produce high test scores. For Jones and her teammates, every aspect of the lesson-study process had something to teach them. Their discussions were open and rich, and they learned a great deal from watching each other teach. Jones, who twice modeled a lesson for her teammates, says she was a little nervous at first, "but it was just so nice to have help; that's such a rare experience. I counted on their eyes and ears to keep track of how the kids were doing. When you're giving the lesson, you can't honestly say how it is going. You're too busy teaching."

## Challenges to Face

Lack of time is the biggest obstacle for U.S. teachers. Typically, Japanese teachers' official work day continues after classes are out of session, until about 5 o'clock, allowing them to meet for lesson study during their regular work hours. U.S. schools must find extra funding to pay for substitutes or stipends to pay teachers to stay after school to do lesson study.

Classroom interruptions are another challenge for U.S. teachers. In Japan, interruptions are kept to a minimum, while class periods in the United States are frequently disrupted by announcements over the intercom, attendance collectors, messengers from the office, and ringing telephones. Lynn Liptak, principal at Paterson School 2 in New Jersey, has first-hand experience with lesson study. Liptak notes that Japanese teachers view the lesson as "a story that should not be interrupted."

Many teachers struggle with a burgeoning curriculum. Paterson School 2 switched to a Singapore math curriculum, distributed by SingaporeMath.com in West Linn, Oregon. It is a lean curriculum focusing on key concepts that are efficiently sequenced. This helps teachers focus their lesson studies on those ideas that are most essential for students to learn. In the process, they've improved their own mathematical understanding while raising students' mastery of more complex ideas. Yet, this mastery isn't always revealed in state standardized tests.

"Using the Singapore curriculum, your students' progress may not show up in standardized test scores, because they don't test these kinds of complex problems," she says. Getting students ready to do well on state tests that emphasize rote learning, while also trying to foster students' higher-order thinking skills, is a burden that's felt heavily by Paterson faculty.

"The pressure on teachers at School 2 to prepare for the test is phenomenal," concedes Liptak.

## Lesson Study Pioneers

Despite the challenges, lesson study offers something many teachers long for: the chance to work together to improve student learning. In a guidebook she is preparing for publication this year, Catherine Lewis writes:

> *Our lesson study pioneers will need to be brave enough to challenge the norms of privacy and isolation that pervade so many schools and to take on work that is both intellectually and interpersonally demanding.*

The teachers in school districts around the country where lesson study is emerging may be pioneering this new practice, but, for most, it feels like coming home.

*Denise Jarrett Weeks is coeditor of* Northwest Teacher.

**References**


Lewis, C. (2000, April). Lesson Study: The Core of Japanese Professional Development. Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA.

Stigler, J.W. & Hiebert, J. (1999). *The Teaching Gap: Best Ideas from the World's Teachers for Improving Education in the Classroom*. New York: Free Press.

Yoshida, M. (1999, April). Lesson Study (Jugyokenkyu) in Elementary School Mathematics in Japan: A Case Study. Paper presented at the annual meeting of the American Educational Research Association, Montreal, Canada.

# Just Because It's Online Doesn't Mean It's Learner-Centered!

The greatest benefit of online professional development courses occurs when participants form a learning community.

**by Ann-Claire Anderson, CORD, Waco, Texas**

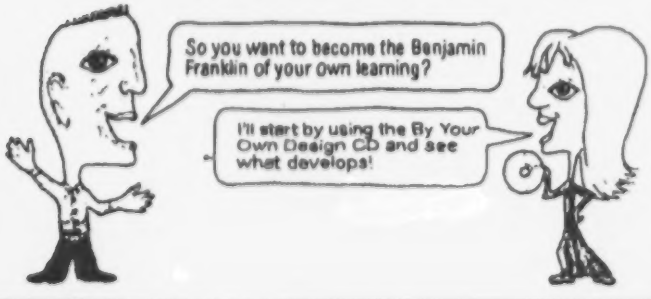
One of the common misconceptions about web-based professional development is that online delivery automatically means the course is "learner-centered." This perception stems from the fact that most online courses allow the learner to engage the material at his or her own pace.

However, true learner-centered professional development must meet the learning needs of participating teachers—in much the same way that they focus on the needs of their own students. As Lorrie Shepard (1995), professional development researcher, explains:

> *Just as constructivist pedagogy would allow students the opportunity to develop their own understandings, teachers need the opportunity to try new instructional strategies, observe what works and what doesn't, and then talk with colleagues about both logistics and underlying rationale.*

Online professional development rarely fills those requirements. In the familiar online course scenario, an electronic exchange of reading materials and writing assignments replaces in-class lectures and discussions. Thus, it could be argued that much online professional development is content-centered, rather than learner-centered. Such courses may be convenient, but they serve primarily as a content-delivery mechanism rather than as a professional development tool.

If we are to move beyond this updated "correspondence course" model to a learner-centered professional development model, course providers first must understand teachers and their profession. Teaching is an inherently reflective and creative process, and teachers need opportunities to reflect on their practice. Collectively, teachers possess a vast amount of knowledge and a deep understanding of how to apply it, but their opportunities for meaningful collaboration are rare in the busy, day-to-day work of teaching. Online courses can provide those opportunities.


So you want to become the Benjamin Franklin of your own learning?
I'll start by using the By Your Own Design CD and see what develops!

## Inventors of Their Own Learning

Professional development cannot be treated as a package to be delivered. It must be recognized as an ongoing process involving idea sharing, reflection, and time. Through this model, teachers become the inventors of their own learning and more important, the re-inventors of their teaching practices.

An online format can offer unique professional growth experiences that allow teachers many opportunities to reflect individually and collectively on both content and practice. CORD, a Texas-based educational nonprofit organization, develops webcourses for science and math teachers. The courses unfold over time, much like a graduate seminar, so that a learning community can be formed. This allows teachers a forum in which to discuss their individual classroom practices and compare them with the experiences of their online colleagues.

A participant in one CORD webcourse describes her experience like this:

> *I enjoyed immensely talking to colleagues online. It is always great to hear that others are experiencing the same things I am, and it is not just me having problems with teaching. However, it is also wonderful to get so many great ideas from all those intelligent, experienced teachers out there.... The [teachers'] comments helped me when I did my planning because [they] told the pitfalls and I worked around them.*

## Online Instructors as Facilitators

Shifting the responsibility for learning to the learner also demands a shift in the instructor's mindset. Online instructors must become skillful moderators, guiding from the sidelines.

Moderators guide discussions to elicit observations of group members, to highlight particularly thoughtful reflections, and to guide the group toward explication of evidence. They do not champion opinions or publicly praise course participants. Instead, moderators recognize mul-

tiple perspectives to further the collective growth of the learning community. In individual communications via online portfolios and emails, the moderator offers specific responses (and grades) to participants.

From the instructor-as-moderator model of the course, participating teachers can observe that being "a guide on the side" doesn't mean abdicating responsibility or giving up order for chaos. They learn that orderliness can coexist with flexibility in their own classrooms.

## Learning That Extends Offline

A well-designed webcourse recognizes that online professional development does not take place only online. Learning takes place offline in activities conducted in the classroom and then discussed online. As teachers try out new teaching techniques, they receive feedback on ways to improve their implementation of such practices. The success of a few teachers challenges and encourages others. Capitalizing on learning that occurs both inside and outside the virtual classroom leads to effective, learner-centered professional development.

In a CORD online course, a typical week's assignments include not only readings about educational theory and teaching practices—the academic focus—but also activities for the participants to facilitate within their own classrooms—the practical focus.

One example from CORD's Teaching Algebra Contextually course is the Battleship and Mines activity, which turns the classroom floor into a coordinate system to illustrate systems of equations. (This works particularly well if the floor has square tiles that can serve as the grid.) Students are divided into groups, with each group commanding a battleship. They are asked to navigate a course across several enemy shipping lanes—each represented by a different linear equation. Their mission is to lay mines at the points where their course will cross the known enemy shipping lanes.

This type of activity gives teachers the opportunity to observe learning theory and practice in action in their own classrooms. Every activity is followed by an online discussion revealing teachers' reflections on what they have read and the reality of the classroom, as illustrated by this excerpt from a post-activity discussion:

> *I have attended conferences where I listened to speakers talk about doing activities in class and have even been given handouts with ideas. It took this course and being forced to do the activities to finally get me motivated to try them. I think I was always a little fearful before. Would I be able to handle it correctly, what would my department say, how would the students react? I do feel that the feedback from the other participants was the best part of this course. Someone else is out there experiencing the same things I am and facing the same problems and obstacles that I am facing.*

The support this teacher feels from the learning community takes her out of isolation and empowers her to try new teaching strategies.

## Factors for Success

For an online professional development course to succeed, course creators and instructors need to keep these factors in mind:

- The course must be immediately useful to participants. This can be accomplished by incorporating activities applicable to the subjects that the participants are currently teaching.
- The online discussion center/chat room must be available 24 hours a day. This allows for asynchronous posting of reflections and observations and recognizes that learning occurs all the time.
- Participants must be comfortable with technology. Teachers' chance of success will increase if they receive help in learning new technology including the use of email, Internet searches for teaching resources, and navigation of the online course.
- Instructors should model the teaching behaviors that they wish to see participants adopt.

Teachers can also look for these factors when selecting online courses. After all, course designers and moderators may provide the course outline and direction, but the participants provide the substance through their involvement in online discussion and activities in their own classrooms.

Participating in learner-centered online professional development requires intense, active engagement with both external resources (readings, activities, and discussions) and internal resources (reflection on ideas and adoption of new attitudes). The quality and quantity of each participant's involvement determines whether he or she will achieve meaningful professional growth.

*Ann-Claire Anderson is the director of learning technology for CORD, a nonprofit organization focusing on vocational and technical education. To learn about CORD's online courses, contact her via email (anderson@cord.org) or by calling (800) 972-2766, extension 203. For more information about CORD, visit the web site (www.cord.org).*

**Reference**

Shepard, Lorrie A. (1995). Using Assessment to Improve Learning. *Educational Leadership, 52*(5), 38-43.

# Home-Grown Professional Learning

Teachers in one district find success in a Summer Science Institute that they design and implement themselves.

by Ronald Havlice, Coffman High School, Dublin, Ohio

Several years ago, secondary science teachers in our school district were faced with a number of new challenges. Teachers were struggling to understand and implement national science standards that were the basis for the Ohio Science Model Curriculum. Student achievement was to be evaluated with state proficiency tests. Courses needed to be redesigned to reflect an inquiry approach. Graduation requirements in science were increased from one year to three years, and teachers needed direction in the creation of new courses to meet student needs. The science curriculum also needed to be more carefully coordinated K-12.

It was unrealistic to expect science teachers to meet all of these challenges alone or in committee meetings at the end of an exhausting day of teaching. Our solution? We created our own Summer Science Institute, five half days in August during which high school science teachers meet for professional development.

## Owning the Program

Since attendance at our science institutes is voluntary, it was clear from the beginning that the agenda had to be meaningful. That can only happen if the agenda emerges from teachers' expressed needs. Over the years, we have learned that institute agendas may need to be revised during the week of the institute to accommodate needs expressed in comments offered by teachers at the end of each day.

Teachers took ownership of the institute from the very beginning. The first year, they wanted to spend their institute days comparing our state model science curriculum with the national science standards and analyzing the impact of both on the classroom and student learning. Later, teachers requested such topics as developing inquiry lessons, team building, addressing technology issues, and creating curriculum guides. Through teacher input, we have used institute days to start a rigorous safety plan and to learn more about assessment issues such as rubric design and use, performance-based assessment, and extended-response questions.

Our teachers recently decided that they wanted to learn how to interpret and use disaggregated student test data so that instruction can be designed to meet the needs of all students. Experts in analyzing test data from our own and nearby districts were invited to help us learn to use the data for our own classes. We had not realized how exciting pages of data could be! We marveled at the richness of information for planning our work with students. (Editor's note: See article on page 26 for more about using data for educational improvement.)

## Throughout the School Year

If the Summer Science Institute were the only time during the year when important issues were addressed, I am sure the level of impact in the classroom would be minimal. Instead, science issues identified at the institute are also addressed in subject area and department meetings and in

## Saving a New Teacher

It was the end of the day on Friday after only two weeks of school, and Drew, a new science teacher, was upset and discouraged. Turning to colleagues he had worked with at our Summer Science Institute, he confided that he worried about even coming back on Monday.

Drew was working day and night planning lessons. He was not only exhausted, he was doubting his ability to teach. After listening, Lorrine, a fellow science teacher in the same subject area, gave him an easy-to-do lesson for Monday. The team asked him to take no work home for the weekend—his weekend work was to rest and not think about school.

Drew was invited to come into Lorrine's classroom every day and to repeat her lesson in his classroom. He did not have to plan any lessons, write any handouts, or even prepare any exams. He was to focus his efforts on using the prepared lesson and working with his students. Drew did this for the remainder of the semester, experiencing success and gaining confidence.

During the second semester, Drew did not visit Lorrine's classroom but continued to talk about what to do and relied on what Lorrine and other colleagues had to share. Drew's second year in the classroom was a success, and that year he assisted a brand-new teacher—providing advice, guidance, and friendship that I believe helped that new teacher have a great first year.

teacher-planned professional development sessions throughout the school year.

The success of the first Summer Science Institute for high school teachers encouraged the middle school science teachers to do something similar in subsequent years. In the past there was little coordination among the high schools, middle schools, and elementary schools. Now, vertical teaming with the middle school and communication with elementary teachers and administrators have resulted in a K-12 science curriculum for which each course or grade level is accountable for identified science outcomes. We have produced a coordinated curriculum, now the centerpiece of our science program.

We have also established the Science Council—a curriculum group consisting of one science teacher from every building. The group meets several times during the school year, usually for daylong sessions. This ongoing attention to science issues identified at the institutes helps us continue to improve as we function as an effective team.

## A Culture of Collaboration

The most gratifying result of the Summer Science Institutes is the development of a culture of collaboration. Teachers share materials and refine and polish lessons to maximize student learning. Most teachers feel they are part of a team and no one needs to work and handle problems alone.

This level of collaboration is especially important to new teachers. Before we started the summer institute, new teachers met their colleagues during one teacher workday before school started. They were told they could ask for help but were apprehensive about doing so because of teachers' busy schedule as they got ready for a new school year. It was a sink-or-swim situation.

At the Summer Science Institutes, new teachers have a chance to meet their colleagues and become comfortable with our school community in a relaxed atmosphere. They get to know the people with whom they will be working and begin to build a communication network. New teachers receive a curriculum guide for the courses they will be teaching and have discussions with their experienced colleagues. They know whom to ask for help and do so because they know their fellow teachers.

The Summer Institute has allowed us to build a learning community where teachers feel comfortable talking through issues, successes, and difficulties every day. Every new teacher at my school has wondered how any teacher could even contemplate starting the school year without something like the Summer Science Institute. (See box on page xx.)

## Administrative Support Makes It Possible

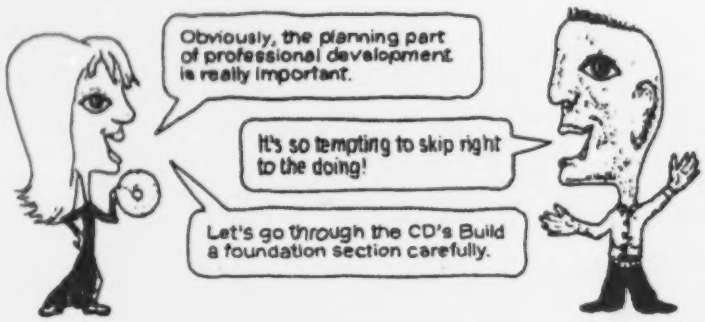
The progress we have made in science instruction in our district as a result of the Summer Science Institute would not have been possible without administrative support. However, we have learned that it is our responsibility to inform administrators of our efforts and needs. When they are included in our conversations and planning, they can respond to our requests. We cannot expect administrators to meet our needs if we don't tell them about those needs.

Because of open communication, administrators at both the building level and at central office have worked closely with us. They have provided a stipend for attendance at the institute, which has made a difference in attendance for several science teachers. Administrators have also arranged for teachers to obtain graduate credit or CEU credit for their work at the institute.

The institute has helped us obtain administrative backing for efforts outside the institute, such as providing support for several teachers to attend safety courses so they could bring that information back to us. The administration has also assisted us with a grant that provided extensive preparation and teacher training for a new course in physical science that is being implemented this year. Principals have adjusted their building budgets to support our learner-centered science curriculum.

Our Summer Science Institute has been the catalyst that has produced significant improvement in science instruction and learning in our school district. The feeling of program ownership, ongoing collaboration, and support from the district administration make science teaching an exciting—and rewarding—journey.

*Ron Havlice teaches chemistry and is the science department chairperson at Coffman High School in Dublin, Ohio. He has more than 25 years of experience in science teaching and is the co-director of the district's Summer Science Institute. Email: havlice_ron@msmail.dublin.k12.oh.us*


Obviously, the planning part of professional development is really important.
It's so tempting to skip right to the doing!
Let's go through the CD's Build a foundation section carefully.

# A Visit to the Summer Science Institute...

by Carol Damian, ENC Instructional Resources

I accepted an invitation from the Dublin teachers to visit their Summer Science Institute on a hot day in August. More than 40 high school, middle school, and special education science teachers were present, along with a building principal. Some of the educators had many years of experience with this district, some a few years, and several were just starting their teaching careers as the institute began.

There was a full agenda of topics suggested by the participants. When I arrived, the library tables were surrounded by small groups of teachers in excited conversations about the topic of the hour:

The pros and cons of having common exit exams for each high school science course in the curriculum—throughout the large science departments in both of the district high schools.

I listened in on their thoughtful conversations. The larger group composed the following list of "pros," arguments for common district exams:

- Common exams would be fair to all students, no matter who the teacher is.
- Teachers working together could create a quality exam, improving it over time.
- Teachers could collaborate to make sure all required topics are taught well.
- Common goals would be the focus of a common exam (a united front).
- The results of a common exam would allow teachers to evaluate themselves.
- The exam commonality among all the teachers would help the special education teachers focus instruction for their students.

And then teachers considered the "cons":

- Common exams may limit the value of a teacher's own strengths and interests.
- It should not become a practice to only "teach to a test."
- Teachers must take care to meet their own students' learning needs, even though they have to take a common test.
- It might be difficult to find time to develop the exam because all science teachers at both high schools must be included.
- Security for such a test instrument could be an issue.
- Teachers should not be evaluated on the basis of student results.

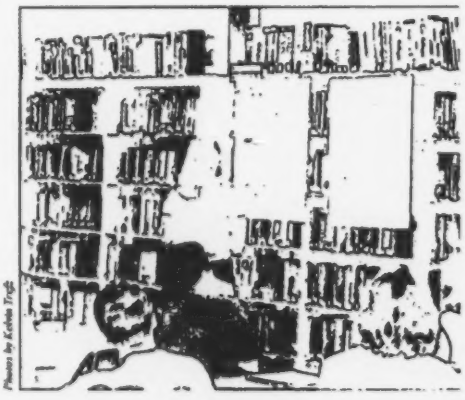
One young teacher looked at the cons and commented, "Our group had a few concerns about writing and implementing common exams, but we all feel that if it is decided here that such a plan would enhance student learning, we can overcome the cons." That seemed to sum up this group's sense of teamwork and where students rank in their priorities.

Before I left the institute that day, I asked the participants to tell me what they consider to be the benefits gained from their teacher-created professional development program. Two comments conveyed the feelings for the whole group:

*This institute is run by our peers, for our peers, and it strongly reflects our needs, interests, and input.*

And:

*This is the most useful professional development time of the entire year—and of my career. We're developing a culture of collaboration.*



Photos by Kathie Troll

# Writing for Professional Journals

This high school teacher explains how writing for journals helps her improve her teaching and her profession—and how you can do it, too.

**by Pamela Galus, Burke High School, Omaha, Nebraska**

*"I don't have anything important to say to other teachers."*

*"There are lots of teachers who are more creative than I am."*

*"I don't want to be rejected!"*

I've used all of these excuses for not writing for professional journals. Even after I had presented at many conferences and found the experience rewarding, I was insecure about submitting my writing to a journal or magazine for educators.

## Why Write for Publication?

In a courageous mood one day, I decided to write an article about a classroom activity that had worked well for my students. The activity wasn't particularly creative, nor was it especially innovative; it was just one of my favorites because I had designed it myself. Even though I knew that I was taking a risk, I sent the activity to a professional journal. A few months later, it was published!

You can increase your own professional learning by writing for *ENC Focus*. See our Writers' Guidelines online (enc.org/focus/write) and on page 15.

When my first article appeared in a magazine, I gained great satisfaction from knowing that other teachers would read it and either try my activity or be inspired to create something similar. After that first article, I was more confident about writing and publishing. I began to fear that eventually I would run out of ideas, but the reverse has been true.

As I plan lessons, writing about the experience is always in the back of my mind. This motivates me to come up with new activities, and my own content knowledge increases. I have become a more reflective teacher because I analyze my practice as I write, identifying what works and what doesn't.

I share my publications with my students, and that motivates them to help me come up with ideas. They are especially excited to get their pictures published. That excitement is something we can all share as we gain a greater understanding of the topic we are studying.

## Writing Your Article

When I wrote and submitted my first article, I had no idea what I was doing, but since then, I have learned that there is really no "wrong" way to proceed. However, experience has taught me that there are ways to increase your chances of being published.

First, think about what you would like to write about and then look at several publications to select one serving an audience that would be interested in your idea. Review several issues of that journal before you even begin to write, paying close attention to style, subject matter, and grade level. You can also write an article first and then try to find a journal that would be a good fit.

Every professional journal has its own unique audience and style. Tailoring your piece to those needs increases the likelihood that your manuscript will be selected for publication.

When writing, it is important to be clear and concise so that the editor and other reviewers will understand how the activity would be implemented. I often ask a friend who has little science background and no teaching experience to read my articles before I submit them. He or she can show me places where I was unclear.

It is also useful to have someone proofread your work for common errors. Because I am so familiar with the piece, I often overlook my mistakes. Frequent misspellings or misused words can reduce your credibility.

Though I usually write an article right after completing an activity and I'm anxious to send my ideas to a journal immediately, I have found it beneficial to set the article aside for a week or more. When I read through it again, I usually catch some errors and make several improvements.

Taking the extra time with the manuscript allows you to process what you did in the classroom, what you might have done better, and what other teachers might need to know about the activity to implement it in their own classrooms. Keep in mind that rewriting, reviewing, and editing only serve to improve the piece.

## Submitting Your Article

When the piece is complete and polished, it is time to submit your article to the selected journal. First, find out about the journal's submission guidelines and copyright policy. Most journals now have web sites where you can find the information. If the journal you select does not have a web site, look for the guidelines and copyright policy in an issue of the journal or email or write to the editor to request a copy of its policies.

In the front pages of most journals you will find an email or mailing address where you can contact the editor. The *ENC Focus* editor prefers email, but some editors still correspond by mail. In that situation, it is professional courtesy to include a self-addressed, stamped envelope to simplify the editor's reply.

When writing to request guidelines and copyright policies, I usually also ask the editor if he or she would be interested in an article on my topic. If the editor expresses interest, I write, "enclosed please find the manuscripts you requested" when I submit the article.

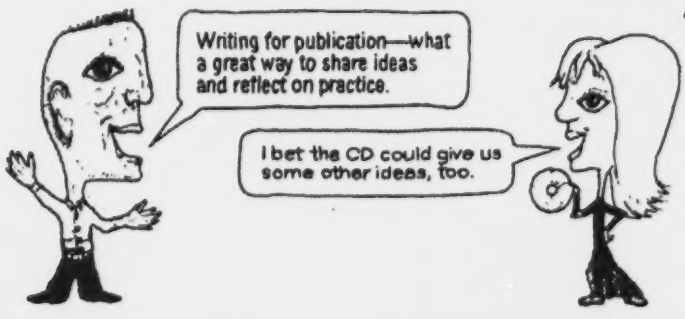
Some journals, including *ENC Focus*, have theme issues. That is, the editors will only select articles for an issue that cover a specific topic. The list of upcoming themes is often included in the writers' guidelines. Occasionally, themed journals are open to ideas that are not related to the topic; however, it is best to first ask the editors if they are interested in your topic.

Even with careful planning and writing, I still get rejected from time to time. I never take rejection personally, but I don't take it casually. It is a learning experience. Occasionally, an editor will take the time to tell me why my piece was rejected, but I can often do a self-evaluation to figure out the reason. It may simply have not fit the needs of the journal. Rather than give up, I rewrite the article and submit it to another journal. I always remember that because I have tried, I have already succeeded.

## The Payoff

Most professional journals do not pay authors for their articles, but most will happily provide the author with copies of the journal. But writing for professional journals is its own payoff—it gives me vitality. It encourages me to look for better ways to do what I do, to keep my curriculum fresh, and to try new ideas rather than use the same lessons that I've had sitting in file folders since 1980.

By writing about my teaching, I have become an innovative, reflective teacher, and I have helped my fellow teachers in the process. I encourage you to write for professional journals—your profession needs you!


Writing for publication—what a great way to share ideas and reflect on practice.
I bet the CD could give us some other ideas, too.

*Pamela Galus is an Earth science teacher at Burke High School in Omaha, Nebraska. She has published numerous articles in journals such as* Educational Leadership, Science Teacher, Instructor, NEA Today, *and* Science Scope.

# Exploring the Unknown—Together

With an Urban Systemic Initiative grant, a school district and a university use inquiry-based learning and a mentoring network to support beginning science teachers.

**by Marianne B. Barnes, University of North Florida, Jacksonville, and Patty Crews, Rosanne Curry, and Jackie Simms, Jacksonville Urban Systemic Initiative**

Like other urban centers in many states, Jacksonville, Florida, is experiencing a shortage of teacher candidates and losses in the ranks of beginning teachers. Teacher preparation and retention have become a focus of the school system's efforts at reform. Under an Urban Systemic Initiative grant, the school system is concentrating its efforts on professional development as a means to retain teachers and improve science and mathematics learning. The school system has formed a partnership with local colleges and universities.

We planned, piloted, and evaluated a team approach to secondary science teacher preparation and development. A science methods course at the university was the setting for our plan. The course had a mix of student undergraduates, men and women from other professions who were seeking teacher certification, classroom teachers in their first or second year of teaching, and a few experienced teachers. Nearly all of the practicing teachers were from the Jacksonville Schools.

As we read professional development literature (Bell & Gilbert, 1996; Lieberman & Miller, 1999; Loucks-Horsley et al., 1998) and pondered our own experiences as teachers and mentors, we decided to focus on the needs of this diverse group of course participants and to initiate a support network that they could access in the future.

The nature of the group demanded approaches that considered their different backgrounds. Mixed grouping was used throughout the course. Although those taking the course for graduate credit were required to delve more deeply into educational research, most assignments were comprehensive enough to meet the needs of both undergraduate and graduate students.

## Modeling Classroom Inquiry

Our main goal was to empower course participants to teach inquiry-oriented science as specified in state and national science education standards. Realizing that many of them had never been exposed to inquiry experiences, we modeled inquiry-based science teaching by doing the following:

- Involving the teachers in an inquiry project
- Encouraging the teachers to reflect on reasons for using inquiry strategies
- Having the teachers work in groups to design and deliver inquiry experiences
- Engaging in group reflection on inquiry-based learning

The topic chosen for the inquiry project was volcanoes. We wanted to address content standards centered on the nature of inquiry, chemical reactions, and the origin of Earth systems. In opening the lesson, we asked participants to engage in a "think-pair-share" strategy to pinpoint their knowledge of volcanoes. Then, we made a concept map from their knowledge. These two strategies reinforced the social nature of learning and the need to identify students' knowledge of a topic before teaching it. We were not concerned about the "correctness" of the students' responses; we simply wanted to map their mental models of volcanoes.

Inquiry continued with small-group exploration using a variation of an online Operation Physics Project activity. Participants shared their findings and questions. Then we presented a scenario in which a geologist needed to determine which of three locations would erupt first so she could warn nearby inhabitants. Groups assumed the role of geologists as they developed problem statements, hypotheses, and plans for further investigation. We checked these plans and asked questions, which prompted participants to refine their plans.

At this point we shared a scoring rubric that emphasized accurate recording of observations and data. Then the groups completed their plans, experimented, and recorded their data. They also presented a "news bulletin," which shared group findings. As the groups presented their findings, we mapped and recorded them.

At several stages in the inquiry process, we asked course participants what we as facilitators were doing and why. Thereby, the inquiry process guided our thinking about factors affecting learning as well as our thinking about factors affecting the eruption of volcanoes.

## Applying Inquiry to Lab Stations

Class members worked with partners to complete a lab station project, which was a requirement in the methods course. While inquiry-based teaching continued to be the overall project goal, participants also took into consideration such factors as class size, grade level, classroom arrangement, and directions for teachers.

One class period was set aside for sharing the projects. Pairs set up their backboards and materials, and the class rotated through the lab stations. The engagement among

the science educators as they prepared their projects was evident. A new teacher described it this way: "Based on the level of excitement I felt, I could imagine how excited the students in a science class would be." From that first semester, we learned that we needed to allow more time for sharing among the groups. Participants were demanding time for discussion and reflection!

In the second semester, participants planned an array of lab stations, ranging from electrochemistry to microbial worlds. Several groups used scenarios to provide context to their activities. The quality of the students' lab stations and the depth of the class discussions about them were evidence of the success of our strategy. End-of-course evaluations and course synthesis papers rated the lab station experience as one of the best aspects of the methods course. A second-career teacher candidate described her reactions this way:

> *I enjoyed the lab stations class so much because it allowed us to step into the shoes of the students. The hands-on experience, being able to touch, feel, break apart, put back together, smell, and taste, gave us the opportunity to inquire and investigate. All of the lab stations were able to grab attention in different ways. That's what makes science so much fun. Being able to explore the unknown.*

This comment is especially encouraging because many beginning teachers in urban schools do not believe that they can trust their students to be active inquirers. They feel the need to emphasize classroom discipline, almost to the exclusion of creating an environment that is most conducive for learning.

## Reflection and Support

While the educational literature encourages structures to support teachers' reflections on their practice, few opportunities are afforded (Houston & Warner, 2000). We cannot assume that complex practices like inquiry are internalized easily, especially when they have not been experienced directly. A teacher with several years of experience wrote about her own practice in an assignment for our course:

> *The inquiry approach has been the single most influential concept that will undoubtedly leave a lasting impression. I realized that I'm not doing this enough. Many of my lessons need to be re-worked (better said flipped 180 degrees), so the students will "own" their learning instead of me giving it to them.*

In a similar fashion, teachers need to "own" their own professional learning. The worth and support of a community of learners needs to be felt authentically from the preservice years into the teaching years. The mixing of preservice and inservice teachers in our course was effective because the participants were able to share experiences and concerns. Competition between groups was reduced as individuals focused more on inquiry and learning than on course grades.

Participants appreciated the interactions with master teachers from the Jacksonville schools, who offered to stay in touch with the new teachers by email and in person. Several practicing teachers taking the courses were visited in their classrooms by the members of the Urban Systemic Initiative, who continue to work with them individually and as group participants. The preservice teachers were encouraged to find a means to enter a support network even before they started teaching in their own classrooms.

All of us benefited from working with one another as professional colleagues. We believe that worthwhile collaboration means valuing and enjoying our individual contributions toward building a program better than any one of us could have produced alone. Emerging from a foundation of trust and mutual respect, collaboration in teacher education should nurture a dynamic learning community that grows in richness with every new teacher participant. A respected, supported teacher will, we hypothesize, grow personally and professionally, helping others along the way.

*Marianne Barnes is professor of curriculum and instruction at the University of North Florida in Jacksonville. She specializes in science education and is a partner with the Jacksonville Urban Systemic Initiative, funded by the National Science Foundation.*

*Patty Crews, Rosanne Curry, and Jackie Simms are master resource teachers in the Jacksonville Urban Systemic Initiative. They specialize in the areas of Earth science, biology, and chemistry education, respectively.*

**References**

Bell, B. & Gilbert, J. (1996). *Teacher Development—A Model from Science Education.* London: Falmer Press.

Houston, W.R. & Warner, A.R. (2000). Reflection on Inquiry and Reflection in Teacher Education: Implications and Reflections. In W.R. Houston & A. Warner (Eds.), *Research on Effective Models for Teacher Education.* Reston, VA: Association of Teacher Educators Yearbook VIII. (ERIC Document Reproduction Service No. ED442750).

Lieberman, A. & Miller, L. (1999). *Teachers Transforming Their World and Their Work.* New York: Teachers College Press.

Loucks-Horsley, S., Hewson, P., Love, N. & Stiles, K. (1998). *Designing Professional Development for Teachers of Science and Mathematics.* Thousand Oaks, CA: Corwin Press

Operation Physics (n.d.). Retrieved September 2001: www.siue.edu/OSME/opphys.html.

# Online Professional Development to Support Curriculum Implementation

*Good online professional development must exemplify the characteristics of good professional development, which include creating a sustained experience rather than a one-time event; engaging practitioners as active learners rather than passive recipients; and offering relevant, job-related content.*

—Building a Space for Professional Learning, *Mosaic*, Winter 2001

**by Wendy Gulley and Paul Hickman, Center for the Enhancement of Science and Mathematics Education (CESAME), and Stephanie Feger, The Northeast and Islands Regional Educational Laboratory at Brown University**

Curriculum implementation is now recognized as an effective vehicle for professional development. Instead of learning content and pedagogy separately, teachers learn both, and what they learn is directly related to what they need to teach. Using a new curriculum also gives teachers an opportunity for professional growth and reflection.

Implementation of a standards-based curriculum is a difficult and complex task. Teachers are dealing with new mathematics and science content as well as different teaching practices, classroom organization, and assessment strategies. They also need to be able to explain these changes to parents and policymakers. Teacher learning that comes as a result of meeting these challenges is job-embedded professional development in the truest sense.

Unfortunately, school systems and curriculum developers do not always have adequate resources to provide professional development opportunities to support curriculum implementation. Another common problem is that "professional development support stops once (or before) the curriculum is fully in place" (Loucks-Horsley et al., 1998).

The Center for the Enhancement of Science and Mathematics Education (CESAME) and its collaborators (see sidebar) have turned to the Internet to answer the need for ongoing professional development for teachers implementing a new curriculum. The CESAME Support Site (www.lab.brown.edu/investigations) focuses on the K-5 mathematics program *Investigations in Number, Data and Space*, which was originally funded by the National Science Foundation and developed at the educational research organization TERC. The curriculum is published by Scott-Foresman.

## A Community of Learners Online

Informal learning plays a powerful role in professional development for teachers, a role that is often overlooked (WestEd, 2000). While the CESAME Support Site for *Investigations* offers structured, formal professional development experiences, a significant goal is to offer opportunities for informal learning. The site was conceived to build a community of learners and provide informal support relevant to the curriculum that teachers are using in their classrooms.

The content for the web site is drawn from teachers who are using the *Investigations* curriculum and other educators who are supporting its implementation. The site has the flavor of the classroom and offers more about specific implementation issues than the informational sites provided by the developer (www.terc.edu/investigations) and publisher (www.scottforesman.com).

The *Investigations* site is interactive and collaborative. Users can and do participate in many ways, from asking questions of the developers to seeking peer partners among other users nationwide. Teams of teachers, leaders, and administrators from implementing schools and districts work together and build upon each other's ideas.

## Site Partners

The groups that collaborate with CESAME in its work with the *Investigations* support site are:

- The Northeast and Islands Regional Lab at Brown University, which hosts the *Investigations* support site on its server and provides significant technical expertise.
- IMPACT Curriculum Trainers for *Investigations*, who work with teachers in school districts throughout New England.
- TERC's *Investigations* authors, who contribute to the site through the Ask the Authors feature.
- The Math Forum, which hosts and maintains threaded discussion areas.
- Scott Foresman, publisher of the *Investigations* curriculum.
- Other NSF Implementation and Dissemination Centers, especially the ARC Center (COMAP), the K-12 Mathematics Curriculum Center (EDC), and the *Investigations* Satellite Implementation Center.

Because resources on the site are provided by educators in the field and not just the curriculum authors and publisher, the site is unbiased. Discussions are open to both critics and fans of the curriculum, giving the site more credibility.

Finally, the site is an ongoing resource. Many of our users are long-time implementers of *Investigations.* Their districts no longer provide curriculum-related professional development, but they are still seeking to deepen their understanding of mathematics and this curriculum as their teaching evolves. A recent contract supports the site for the next five years, and we are seeking additional support from the National Science Foundation.

## Site Features

Two thousand people visit the *Investigations* site each month, and more than 300 have participated in at least one of the following ways:

- posting messages to threaded discussions
- sending in classroom ideas
- listing their district on the Who's Implementing page
- commenting on the monthly Spotlight article or writing their own article
- sending in a question for the Ask an Author feature
- becoming a peer partner to another *Investigations* user
- learning with coileagues in online seminars

The Who's Implementing page lists more than 100 schools or districts from 32 states and seven foreign countries. The schools can list a contact person, with telephone number and email address, and make a brief comment about their experience with the curriculum. Users can get in touch with other users. Ask an Author allows users to pose questions to the developers of the curriculum and receive detailed answers.

E-announcements now reach 200 subscribers twice a month. These announcements keep the subscribers informed of new developments, including the latest Spotlight article and the Ask an Author question.

The newest feature of the site is a series of online seminars. The first was a seminar for math specialists, coaches, and teacher leaders called Leading the Way: Coaching Teachers Using *Investigations.* A preview activity to test the format was held in May 2001, and the full six-week online seminar was held in the fall. The initial seminar attracted significant interest from participants and will likely be offered again in the future.

## Evaluation of the Site

The *Investigations* site was evaluated in the spring of 2000. Assessment methods included a survey posted on the web, phone interviews, and a focus group. The evaluation showed that users see great value in the *Investigations* support site and that the web site content is being used in professional development activities across the country. The results of the evaluation can be found online (www.lab.brown.edu/investigations/spotlight/archive/sept00.html).

Typical of the comments were these:

> *It's a lifeline. I may not use it all the time, but just knowing it is there is tremendous support. I have received feedback on discussion questions, checked out who else is using the program and used the Spotlight articles in our professional development.*
>
> *—Curriculum Specialist*

> *Spotlight and Ask an Author are the first two places I go when I check the site. If there is an article that I think will be beneficial for the staff at my school, I print it and keep a folder with those articles. When we do inservice for other schools, I will pull those out and share them with other people.*
>
> *—Classroom Teacher*

> *This is probably my favorite site on the web! I check it at least once a week for resources, personal support, and validation as I attempt to lead my district and county down the very difficult road of mathematics reform.*
>
> *—Administrator*

> *We are a very small school with limited resources. This site is our way to connect with others who use the same program, have the same problems, and have suggestions for solutions.*
>
> *—Classroom Teacher*

## About CESAME

The Center for the Enhancement of Science and Mathematics Education (CESAME) is a partnership of the National Science Foundation, Northeastern University, federal and state agencies, and private foundations.

Over the course of a decade, CESAME has gained local, regional, and national recognition for its efforts to create awareness and support of school districts' implementation of standards-based mathematics and science curricula.

CESAME is charged with accelerating the implementation of standards-based instructional materials in both mathematics and science. Through the IMPACT Project (see article on page 48), CESAME hosts one of the eight Curriculum Implementation and Dissemination Centers funded by the National Science Foundation. The project serves schools in more than 160 districts in New England.

The Internet is still an under-exploited yet powerful mechanism for providing job-embedded professional development to teachers. As Internet connections become faster and more common in households, we can expect more teachers to have access to the World Wide Web in their homes.

CESAME and our partners are continuing to explore ways that the web can be used to support teachers who are changing their practice in the context of a specific curriculum. Curriculum implementation support sites could change the way we think about delivering ongoing professional development by making it accessible, affordable, and sustained.

*Wendy Gulley is a former math teacher who now manages the CESAME Support Site for* Investigations. *Her work at CESAME has also included assisting district administrators and teachers through the stages of implementation of standards-based curricula.*

*Paul Hickman is a former high school physics teacher who manages the CESAME IMPACT project web site and designs materials to support teacher professional development. His interest in online professional development started more than ten years ago when he served as a moderator for an online physics course at Montana State University.*

*Stephanie Feger is a program specialist at the Northeast & Islands Regional Educational Laboratory, part of the Education Alliance at Brown University. Much of her work focuses on online educational communities.*

**References and Suggested Resources**


Education Development Center (Winter 2001). Building a Space for Professional Learning, *Mosaic*. Retrieved September 2001: www.edc.org/spotlight/mosaic4/intro.htm

Electronic Collaboration: A Practical Guide for Educators. Retrieved September 2001: www.lab.brown.edu/public/ocsc/collaboration.guide/index.shtml

The Knowledge Loom: Professional Development. Retrieved September 2001: knowledgeloom.org/pd/index.shtml

Loucks-Horsley, S., Hewson, P., Love, N. & Stiles, K. E. (1998). *Designing Professional Development for Teachers of Science and Mathematics*. Thousand Oaks, CA: Corwin Press.

Stein, M.K., Smith, M.S. & Silver, E.A. (1999). The Development of Professional Developers: Learning to Assist Teachers in New Settings in New Ways. *Harvard Educational Review, 69* (3).

WestEd. (2000). Teachers Who Learn, Kids Who Achieve: A Look at Schools with Model Professional Development. Retrieved September 2001: web.WestEd.org/online_pubs/modelIPD/welcome.shtml


# Developing

A project of the Center for the Enhancement of Science and Mathematics Education (CESAME) delivers professional development to trainers and coaches who in turn provide help for teachers using new instructional materials.


**by Margaret Bondorew, Center for the Enhancement of Science and Mathematics Education, and Kathleen S. Coleman, Lincoln, Massachusetts**


The IMPACT Project was created by CESAME (see article on page 47) to accelerate the implementation of standards-based curricula in the New England states. In seven regional centers, the IMPACT Project identifies and supports curriculum trainers who deliver professional development to teachers.

Since standards-based instructional materials first appeared, many people have expressed concern that some teachers may not know the necessary mathematics and may hesitate to admit it for a variety of reasons. It is also evident that teachers do not always have a clear understanding of how a mathematics strand develops from the primary grades into secondary school. CESAME developed its curriculum trainer model with these concerns in mind.

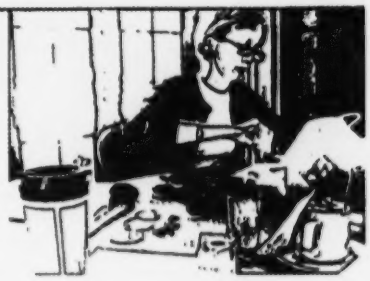
## How the Program Works

CESAME recruits curriculum trainers from a pool of teacher leaders, Presidential Award recipients, retired educators, scientists, engineers, mathematicians, museum directors, and representatives from higher education. High priority is given to those with previous classroom experience involving standards-based curricula.

The recruits enroll in an apprenticeship program, which requires attending a one- or two-week summer institute with follow-up weekend sessions. They then practice their skills under the watchful eyes of mentors. Curriculum trainers leave the apprenticeship prepared to model good teaching practices and lead workshops.

CESAME continues to provide professional development and support for the curriculum trainers through threaded discussion groups on the IMPACT web site (projects.terc.edu/impact), annual curriculum trainer conferences, listservs, and use of the IMPACT Centers resource libraries. Many IMPACT curriculum trainers remain in the classroom and are available to present workshops after school, on weekends, or during the summer, while others work as full-time consultants, either on their own or for publishers of the programs.

# Professional Developers



Photos by Claire Duggan

By spring 2001, more than 200 curriculum trainers had been certified to work in school districts. They provide professional development workshops for several standards-based programs, including National Science Foundation-developed curricula and other mathematics programs that have received high ratings from the IMPACT Center review teams. The teams review materials using the IMPACT Math, Science, and Technology Instructional Materials Evaluation Tool, which is available online (projects.terc.edu/impact/template/resources/msthtml.cfm).

During the past year, CESAME has expanded its curriculum trainer program to provide professional development for coaches. Many of the curriculum trainers have opted to become coaches as well. These individuals wear two hats. As coaches, they work individually with classroom teachers, helping them become more aware of their own thinking and decision-making processes. As curriculum trainers, they help districts implement standards-based mathematics curriculum.

*Margaret (Peg) Bondorew is currently an associate director of CESAME at Northeastern University. She is also a co-principal investigator on the NSF funded IMPACT Project.*

*Kathleen S. Coleman is an educational consultant in Lincoln, Massachusetts. She is the writer of the state's mathematics framework, Achieving Mathematical Power.*

For more information about CESAME's curriculum trainer program, visit the web site (www.cesame.neu.edu) or contact Marilyn Decker, director at the Center for the Enhancement of Science and Mathematics Education, Northeastern University, 716 Columbus Avenue, Suite 378, Boston, MA 02120, or call (617) 373-8383. Email: m.decker@neu.edu

## In a Teacher's Own Words

In an interview with Kathleen Coleman, Maureen Feeney, a fourth-grade teacher in the Natick, Massachusetts, school district, talks about her experiences with CESAME's curriculum trainers. Feeney has taught for 33 years and was accustomed to using a basal math text. Until she worked with the trainers, she was a skeptic of the standards-based curriculum.

**How did you first become involved with Investigations in Number, Data, and Space?**

Our district decided to implement the entire K–4 curriculum at the same time. While some teachers in the district had piloted the program, most of us had never had any experience with it. We were enthusiastic, but we questioned whether we would be able to do it; the mountains of materials were overwhelming. I felt as though I was entering the realm of the unknown.

**After this initial feeling of uncertainty and the first few sessions with a curriculum trainer, were there changes in how you taught mathematics?**

Yes, definitely. We were told to bring our books and samples of students' work. All of us shared our experiences with certain units or looked at what another teacher had done with a lesson. I made notes reminding myself to change this or that when I taught a certain unit next time. I felt much more secure in what I was doing, and felt empowered to try new ways.

**In what ways did the trainers reaffirm, or validate, what you were doing in your classroom?**

I remember thinking that it was going to be almost impossible to teach every activity and unit in the program. When I brought these concerns to the trainers' sessions, it became clear to me that I did not have to teach every unit. The trainers helped us identify which parts of the program were crucial for students to learn. I needed to hear this. It enabled me to teach some topics in greater depth.

**Did you learn any specific math content in the sessions?**

I remember one activity in which we were given fractions with different denominators and told to place them on a number line. We thought this would be easy. But we found that we made mistakes, misplacing our fractions. We relied on our strongest colleague. Just like our students do.

During another activity, we identified and compared geometric shapes. Some of us could do it with ease, others struggled. Experiences like these helped us understand what students are doing every day in math class. Just as some of us could quickly place fractions on a number line, some of us had to take more time. It's very revealing to be a math student again and see where your strengths and weaknesses lie.

**What other support did the trainers offer?**

It was good to hear from them that we could assign computation games as homework. I felt we had a better chance of ensuring that the children will be practicing computation skills. Families need to be assured that all of this—concept work and computation skills—is mathematics. Taken together, concepts and skills help their children achieve success.

# Teachers Becoming Self-directed

All teachers can design their own professional development. They just need to know how. This collaboration between a university and a school district gives teachers that knowledge.

**by Jane Horwitz and Bonnie Hallam, Penn-Merck Collaborative for Science Education, Philadelphia, Pennsylvania**

A constructivist view of learning supports the value of learner-directed professional development. However, the ability to direct their own learning does not come naturally to all teachers. In most cases, reflective, internally motivated practitioners need to be cultivated. The Penn-Merck Collaborative for Science Education, a partnership between the University of Pennsylvania and the School District of Philadelphia, exemplifies the belief that the "content of professional learning must come from both inside and outside the learner" (Loucks-Horsley et al., 1998).

Since 1994, when the Penn-Merck initiative was launched, its definition of professional development has shifted from something that is done to teachers to something that teachers do for themselves. Putting stated beliefs into practice, however, can be challenging.

## A 13-Month Commitment

The program takes the form of a 13-month-long graduate course designed to strengthen participants' ability to teach science successfully in the elementary and middle grades. The course is offered free to teachers through a grant from the University of Pennsylvania.

Applications for the program are mailed to area school principals who enroll a team of teachers. Participants who are not enrolled as part of a school-based team are asked to apply with a partner teacher with whom they would like to work.

The course begins one summer and ends the next; both summers, teachers attend three-week institutes filled with science content and hands-on activities. During the school year in between, a seminar component provides ongoing support as teachers apply new ideas in their classrooms. Seminar groups of 15 to 20 teachers meet monthly from September through May, facilitated by a university-based Penn-Merck staff member and a classroom teacher.

## Changing to Meet Teacher Needs

During the first years of the program, the seminars looked like traditional graduate-level courses: carefully-detailed syllabi on topics of the instructors' choosing, required readings, specific homework assignments, science demonstrations, and facilitator-led presentations on important aspects of pedagogy. The low number of teachers who completed all aspects of the course was an indication of its lack of relevance to the participants. This negative feedback forced a change that proved to be an enormous benefit to both the participants and the program.

The seminar now relies on the teachers' own experiences to provide the basis for both individual and group reflection. While maintaining elements of a graduate-level education course, the current approach has much more of a study-group feel. The course is still developed by the Penn-Merck staff and seminar facilitators, based on the idea that self-directed learning must nonetheless be guided, particularly when teachers are new to this way of thinking.

Learning objectives are met through three distinct but interrelated approaches that build the participants' ability to conduct self-directed professional development: participant journals, examination of teacher and student work, and collegial partnerships.

## Participant Journals

Monthly journal entries written by each participant become a dialogue as course instructors respond in writing. Journal writing assignments encourage teachers to make their own meaning out of seminar discussions and readings by trying things out in their own classroom. Teachers are also encouraged to raise questions about how the ideas do or do not apply to their experiences.

These journals are a significant component of the seminar. Rather than judging the entries by a set of criteria determined by the instructors, a rubric for journal assessment is developed collaboratively by all of the members of the group. Through this process, participants are reminded of the need to take responsibility for their learning by evaluating their own progress.

# Learners: A Work in Progress

## Examining Teacher and Student Work

Encouraging teachers to discuss their practice is the backbone of the seminar experience. Talking is an opportunity for them to share their successes and struggles with new approaches to science teaching.

Early in the year, however, it is easy for this activity to degenerate into a "show-and-tell" format in which teachers do not thoroughly examine the classroom situation. Often, feedback from colleagues is superficial to avoid hurting anyone's feelings. Other comments might not be relevant to the presenter. While there tends to be a great deal of talking, there is not enough listening. This kind of interaction has little benefit for the teachers.

To help teachers engage in meaningful conversation that can be applied in the classroom, Penn-Merck now uses the Annenberg Institute for School Reform's Tuning Protocol—a structured means of looking at student and teacher work. The sidebar on this page shows the way the protocol works. For more details, see the web site (www.lasw.org/Tuning_description.html).

At each session, a teacher raises a question for the group to consider, followed by a brief description of a situation from his or her classroom for examination. The teacher brings artifacts, often samples of student work, to share with colleagues. The rest of the group, at designated points in the Tuning Protocol, asks clarifying questions and gives constructive, candid feedback. Finally, the teacher summarizes what he or she has learned from the experience, and the entire group reflects on the value of the interaction. One teacher from the group is assigned to make sure that each segment of the protocol takes its designated amount of time. The entire process takes about one hour and 15 minutes.

At the beginning of the course, teachers often find the rigid structure of the Tuning Protocol to be confining and somewhat frustrating. Focus questions raised early in the semester tend to be overly broad, and sometimes the assembled artifacts do not adequately illustrate the issue under consideration. Over the course of the seminar, experience with the protocol leads to marked improvement in the quality of both the teachers' queries and the group's feedback. By the end of the seminar, teachers are comfortable accepting criticism from their colleagues and more confident in their ability to generate their own meaningful course of inquiry. See box on the next page for one teacher's reflection on using the protocol.

## Schedule for the Annenberg Tuning Protocol

**1. Introduction ..... 5 minutes**

- Facilitator briefly introduces protocol goals, guidelines, and schedule.
- Participants briefly introduce themselves.

**2. Teacher Presentation ..... 15 minutes**

**Teacher Presents:**

- Context for student work (assignment, scoring rubric, etc.)
- Focusing question for feedback.

**Participants are silent.**

**3. Clarifying Questions ..... 5 minutes**

- Facilitator judges which questions more properly belong in warm/cool feedback.

**4. Examination of Student Work Samples ..... 15 minutes**

- Samples of student work might be original or photocopied pieces of written work and/or video clips.

**5. Pause to Reflect on Warm and Cool Feedback ..... 2-3minutes**

- Participants may take a couple of minutes to reflect on what they would like to contribute to the feedback session.

**6. Warm and Cool Feedback ..... 15 minutes**

- Participants share feedback while teacher-presenter is silent.
- Facilitator may remind participants of teacher-presenter's focusing question.

**Teacher-presenter is silent**

**7. Reflection ..... 15 minutes**

- Teacher-Presenter speaks to those comments/questions he or she chooses to while participants are silent.
- Facilitator may intervene to focus, clarify, etc.

**Participants are silent.**

**8. Debrief ..... 5 minutes**

- Open discussion of the tuning experience the group has shared.

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## Collegial Partnerships

In the final months of the school year, teachers carry out an investigation in their own classrooms. While this experience builds on skills learned from the Tuning Protocol, the questions raised are broader in scope rather than specific to a particular lesson (e.g., "How can I make my cooperative groups more effective?" or "How do I teach to a multilevel classroom?"). Penn-Merck staff assists each teacher during the question formulation stage.

Most significantly, this investigation is carried out in partnership with a colleague—usually one of the teacher's own choosing. This person is not thought of as a mentor, but rather a critical friend who shares interest in the question being addressed.

Together, these partners plan how to complete their inquiry, including the actual mechanics of how the work will be completed. Some teachers visit each other's classrooms; others use videotape to share their practice. While the methods have varied, the most successful partnerships have involved similar elements: articulation of a meaningful question, opportunity for teachers to observe successful models, observation of classroom practice by a nonjudgmental colleague, and ongoing, significant feedback. Finally, the collegial partners each hand in a final paper that reports and reflects on their collaborative work.

At a wrap-up session held at the completion of the course, teachers share their partnership experiences with the rest of the class and the program's staff. Participants talk about the evolution of their attitudes toward self-directed learning—from reluctant practitioners to teachers who enthusiastically embrace the value of investigating one's own questions and ideas.

After completing the course, teachers often assume leadership roles in their schools and the district. We also often see graduates at voluntary professional development events hosted by the district or the university.

Those delivering professional development to mathematics and science teachers are responsible for providing the scaffolding that enables teachers to design their own professional learning. All teachers are capable of self-guided professional development, but they must learn how to bring it to fruition.

*Jane Horwitz is associate director and Bonnie Hallam is field director of the Penn-Merck Collaborative for Science Education, an NSF-funded teacher enhancement program at the University of Pennsylvania's Graduate School of Education. After six years working with elementary school teachers in Philadelphia, the initiative is now focusing on the middle grades.*

## A Teacher Uses the Tuning Protocol

When it was my turn to present my tuning protocol, I was not nervous because I had a clear objective. I wanted my students to use scientific language in responding to their lab experiments. It was a simple objective that I hoped would generate constructive feedback.

The presentation of student work was quick and direct. I did not bring in all the student work because I knew we would not have enough time to examine 30 responses. Instead, I selected work that informed my objective of getting students to be more descriptive in the lab responses.

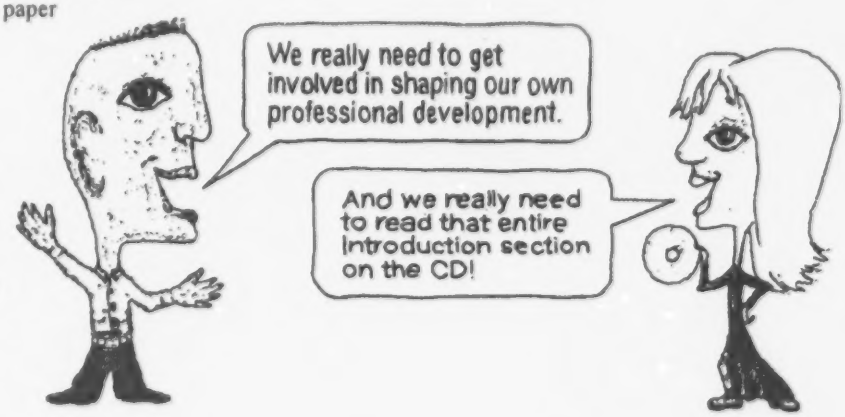
I realized from my peers' presentations that feedback is meant to aid instruction. I did not view comments as an attack on my teaching. Rather, I listened and used the feedback as means of improving my future lessons.

**—Sarun Ok, Charles Drew Elementary School, Philadelphia**


**References**

Costa, A. & Kallick, B. (1993). Through the Lens of a Critical Friend. *Educational Leadership 51*(2), 49-51.

Loucks-Horsley, S., Hewson, P., Love, N. & Stiles, K. (1998). *Designing Professional Development for Teachers of Science and Mathematics.* Thousand Oaks, CA: Corwin Press.



We really need to get involved in shaping our own professional development.
And we really need to read that entire Introduction section on the CD!

# The Glenn Commission and Professional Development

The professional growth of teachers is a key concern of the National Commission on Mathematics and Science Teaching for the 21st Century.

**by Paul Kimmelman, North Central Regional Education Laboratory, Naperville, Illinois**

Created in 1999, the National Commission on Mathematics and Science Teaching for the 21st Century is more commonly known as the Glenn Commission, named for its chairman, former United States senator and astronaut John Glenn. In September 2000, the commission issued a report, *Before It's Too Late*, offering a comprehensive plan to improve mathematics and science teaching and learning.

The commission recognized that numerous factors throughout society must be addressed for systemic improvement to occur. On the other hand, commission members believed that it was only logical to begin the improvement process where teaching and learning take place—in the classroom with the teacher. Thus, professional growth for teachers became a key element of the commission's report.

## What Is Missing?

The commission began by agreeing that effective professional development needs to address teachers' lack of preparation in mathematics and science content and to build teachers' instructional and leadership capabilities. Professional development programs must also help teachers attain a high level of pedagogical content knowledge. Finally, professional development for teachers must result in improved achievement for students.

Educational research has identified the essential elements of effective professional development programs, but the commission found that opportunities in most school districts are limited to inservice workshops that have little relevance for teachers. The commission was advised that only 25 to 30 percent of teachers voluntarily agreed to participate in this type of workshop, even when remuneration was offered.

What is missing?

- A comprehensive research base
- Evaluation of the effectiveness of professional development programs
- Research on the best use of teacher leaders
- Reduced teaching loads to increase learning opportunities for teachers
- Adequate fiscal support
- Attractive incentives for teachers to participate
- Widespread public support for professional learning for teachers
- An understanding that professional development should provide growth opportunities, not just remediation
- Accepted standards that define good practice
- Translation from what students must learn to what teachers must know to help them learn it
- School organizational structures that support and focus teacher motivation to adopt good instructional practices.

## Solutions

Speaking to the commission, William Firestone, chair of the Department of Educational Theory, Policy, and Administration at Rutgers University's Graduate School of Education, offered a number of suggestions. He recommended that every supervisor or content leader should be a classroom teacher. According to Firestone, too many people who are responsible for improving teaching practice work outside the classroom. There is a real need to look upon teachers as leaders and assign them responsibilities to help their colleagues improve.

Firestone also emphasized the need to use assessment of student achievement in a meaningful way. Used properly, such assessment can create a context for improved learning and professional development. He cautioned the commission that the use of assessment should not lead to merely teaching to the test.

Another presenter to the commission was Susan Loucks-Horsley, who, until her untimely death in 2000, was the associate executive director of the Biological Sciences Curriculum Study where she oversaw professional development and leadership initiatives for science educa-

tion. Loucks-Horsley emphasized the essential components of high-quality professional development. First, the process needs to be continuous and sustained over time. It is not, as noted earlier, a single workshop, but rather it is a process that provides an adequate amount of time for teachers to learn and make meaningful changes in their practices. She noted that high-quality professional development could take from 80 to 100 hours, a commitment of time that is very different from that of traditional inservice offerings in most school districts.

Next, Loucks-Horsley stated that when professional development centers on high-quality teaching, "it cares deeply about subject content." Meaningful learning for all students is the focus. Professional development activities that help teachers better understand the subject content they teach ultimately lead to increased student achievement.

Leadership that includes teachers as well as traditional authority figures is also an essential component of successful professional development, according to Loucks-Horsley. Leaders who understand the elements of high-quality professional development will encourage teachers to participate in programs that lead to improved teaching and learning. They will also actively involve teachers in planning their own learning experiences.

## The Commission's Recommendations

As a result of these and other consultations, the commission defined professional development as a planned, collaborative, educational process of continuous improvement for teachers. The commission recommends professional development for teachers that:

- deepens their knowledge of the subjects they are teaching.
- sharpens their teaching skills in the classroom.
- promotes awareness of developments in their fields and in education generally.
- generates and contributes new knowledge to the profession.
- increases their ability to monitor students' work so they can provide constructive feedback to students and appropriately redirect their own teaching.

The full report of the National Commission on Mathematics and Science Teaching is available on the web (www.ed.gov/americacounts/glenn). The report offers a number of recommendations for the improvement of mathematics and science education as well as suggestions for school boards, superintendents, principals, teachers, parents, state leaders, higher education representatives, and business. Improving mathematics and science education won't be easy or inexpensive. But America can't afford to confront the same problems in the future.

*In addition to serving as a member of the Glenn Commission, Paul Kimmelman is currently special advisor to the executive director of the North Central Regional Education Laboratory (NCREL) in Naperville, Illinois, and senior consultant to Project 2061 Professional Development Programs. Formerly, he was superintendent of the West Northfield School District No. 31, Northfield, Illinois, one of the First in the World Consortium of districts that participated in the Third International Mathematics and Science Study (TIMSS).*

*NCREL recently received a grant to organize a technical assistance center for professional development. Plans will be announced on the organization's web site (www.ncrel.org).*

# From a Science Teacher's Perspective:

A science teacher's enthusiasm soars to new heights at NASA's Kennedy Space Center.

**by Jan L. French, Cincinnati Country Day School, Cincinnati, Ohio**

Recently, I participated in NASA's Educational Workshop (NEW), a free two-week summer program at the Kennedy Space Center in Florida. The goal of the program is to promote science (particularly space science), math, and technology education. I was one of 25 teachers who were selected based on classroom experience and willingness to train other teachers.

We were given many behind-the-scene opportunities that are unavailable to the general public. For example, we observed construction on two International Space Station (ISS) modules and the refurbishment of the Discovery space shuttle, we watched the launch of a rocket carrying a communications satellite, and we toured the historical launch sites of the Mercury, Gemini, and Apollo missions.

I worked directly with NASA engineers, scientists, technicians, and education specialists. The education specialists are certified teachers who have left the classroom to join in NASA's education efforts, including conducting workshops and writing curriculum. They were extremely helpful in transferring my

NASA experience into meaningful classroom activities for my students. In addition, they provided me with ideas for presenting these learning activities at professional conferences so that other educators can also benefit from my experiences.

## Experiencing the Space Center

NEW showed me firsthand the inner workings of NASA. The behind-the-scene tours demystified the space program and made me feel as if I were a part of it. NASA scientists and engineers are extremely dedicated to their work, and it was easy to get caught up in their enthusiasm..

Each morning we toured a different area of the Kennedy Space Center facilities. We visited most of the launch sites, starting with the very first U.S. missile, Explorer I, and ending with the launch pads of the current space shuttle. The crude cement launch pads and blockhouses of early space flights were state-of-the-art in their time, but they are no comparison to the modern-day facilities used to launch space shuttles. Standing at the base of the shuttle launch pad made me feel I was a part of the NASA team, a primary factor in my enthusiasm to go back and teach what I had learned.

Our workshop continued with a tour of the Orbiter Processing Facility, where the space shuttle Discovery was being refurbished after its last flight. What impressed me most on this tour was how the tech-

*continued on page 56*

# From a Math Teacher's Perspective:

## Working with Scientists Makes All the Difference

## Take Ownership of Your Professional Learning

A mathematics teacher provides tips for teachers who want to become more involved in their professional development.

**by Jaclyn Snyder, Langley High School, Pittsburgh, Pennsylvania**

Education is high on state and national agendas. The profession is under pressure to deliver better teaching and better teachers. The critical challenge we face is to meet the relentless demands upon our profession with continual growth and marked improvement.

School reformers have encouraged teachers to leave their post at the front of the classroom and entice students to take control of their own learning. Teachers have become increasingly concerned with involving students in their education instead of providing one-way dissemination of information. Why, then, should this same attitude not be reflected in our approach to professional development?

Professional development isn't only attending educational conferences or training sessions. It is also becoming involved with curriculum searches, evaluations, and implementations. Working as equal partners with administrators, teachers need to have a clear and respected voice in deciding what is taught in their classrooms. Teachers will derive greater benefit from this kind of professional development.

Here are some tips for teachers who wish to take control of their own professional development:

- Be open to new techniques and technology. Let your administrators know that you would like to be involved when new programs are being considered.
- Ask those who plan inservice programs to bring in professional developers who have a background similar to that of program participants. Math teachers benefit more from professional development provided by other math teachers.
- Connect with other teachers across the country via the Internet. Go online to share reactions to a curriculum and develop strategies for improvement.

## A Success Story

For ten years, I have been involved in a mathematics program called the Cognitive Tutor™, a program that welcomes and uses teacher and student feedback to reshape the learning environment. The professional learning I gained from being involved in curriculum development and implementation was the most valuable of my career.

*continued on page 57*

*From a Science Teacher's Perspective continued from page 55*

nicians worked together to complete each minute detail of refurbishment. Every member of a NASA team, no matter what his or her job, is important—another good lesson for teachers and students alike.

## Meeting the Astronauts

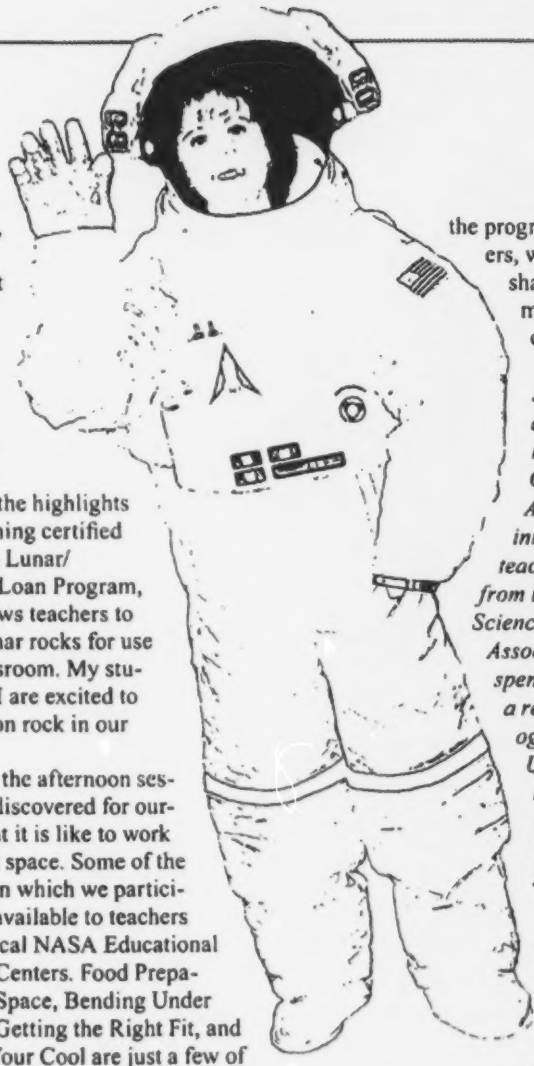
Another valuable NEW experience was a video-teleconference with Steve Smith, an astronaut who helped repair the Hubble telescope in space. During his presentation, Steve recounted that he applied for astronaut training five times before he was accepted. He now holds the record for the second-longest space walk to date.

We also visited with astronaut Jim Harrington in person. Jim is the first Native American astronaut, although he has not yet flown in space. Jim told us that he was an unmotivated student who dropped out of his first year in college because he couldn't grasp the relevance of school to his life. It was not until he got hooked on the wonders of space that he returned to school, earned his degree, and entered the astronaut-training program.

The stories of both of these astronauts encourage my students to reach for their goals despite disappointments and obstacles.

## Preparing to Take NASA Home

While the morning tours inspired us, the afternoon work sessions prepared us to use our experiences in our classrooms. Each afternoon we met at the Center for Space Exploration (CSE) to develop units for our students. CSE's educational specialists were invaluable in facilitating our learning and fine-tuning our plans. We improved our content knowledge, learning more about the solar system and the International Space Station.



One of the highlights was becoming certified in NASA's Lunar/Meteorite Loan Program, which allows teachers to borrow lunar rocks for use in the classroom. My students and I are excited to hold a moon rock in our hands.

During the afternoon sessions, we discovered for ourselves what it is like to work and live in space. Some of the activities in which we participated are available to teachers through local NASA Educational Resource Centers. Food Preparation for Space, Bending Under Pressure, Getting the Right Fit, and Keeping Your Cool are just a few of the NASA lessons I now use in my classroom.

NEW participants also explored rocketry by making balloon rockets, straw rockets, and Alka-Seltzer™ rockets. (See the Resources list.) The culminating project was to assemble and launch model rockets and watch the real launch of a rocket carrying a communications satellite into orbit.

Although my students won't be able to experience Kennedy Space Center firsthand as I did, they do experience it through the curriculum I have brought back with me. NASA has made the space program tangible for students and the general public by imparting the energy of the program to teachers, who, in turn, share that excitement in their classrooms.

*Jan French is a recent recipient of the Gustav Ohaus Award for innovations in teaching science from the National Science Teachers Association. She spent ten years as a research geologist for the U.S. Geological Survey, and then returned to school to earn her teacher's certification. She teaches science to third, fourth, and fifth grade students at Cincinnati Country Day School.*

**Resources**

NASA (1996). Rockets: A Teacher's Guide with Activities in Science, Mathematics, and Technology. NASA Publ. # EG-1996-09-108-HQ.

NASA (1998). Suited for Space Walking: An Activity Guide for Technology Education, Mathematics, and Science. NASA Publ. # EG-1998-03-112-HQ.

NASA (1999). Space Food and Nutrition: An Educator's Guide with Activities for Math and Science. NASA Publ. # EG-1999-02-HQ.

Additional information and application for the NEW workshop is available online (education.nasa.gov/NEW).

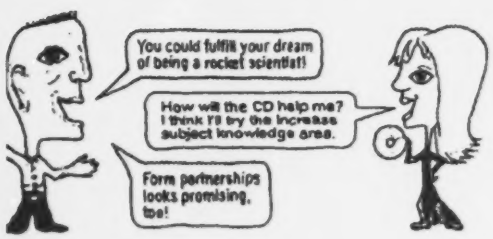
*Photo courtesy of Linda Winkleman*

*From a Math Teacher's Perspective*
*continued from page 55*

I also place great value on the Internet as a source of professional learning. Can you imagine receiving monthly email from a mentor teacher who assists you with professional development? Can you imagine monthly, hosted chat sessions on the web focused on issues such as collaborative learning and personal classroom experiences? I have become a better teacher because I can engage in professional development without leaving my home.

As often as I like, I can log on to the web and instantly I am chatting with a colleague in Alaska or Texas, learning how she prepared an assessment I will use in my classroom, rather than reinventing the wheel. I am not restricted to interactions with math teachers in my geographic community. By collaborating with other teachers and learning that my opinions are important, I am able to give my students something that is beyond value, the wisdom and experience of hundreds of educators who continually inform and reshape my teaching.

*Jaclyn Snyder has taught mathematics at Langley High School for 26 years, serving as mathematics department chairperson for 18 years. She has been active in the New Standards Project at the University of Pittsburgh and has worked with Carnegie Learning's Cognitive Tutor research with Carnegie Mellon University.*
*Email: geometryrules@aol.com*


You could fulfill your dream of being a rocket scientist!
How will the CD help me? I think I'll try the Increase subject knowledge area.
Form partnerships looks promising, too!

# Listening to Teachers

This staff developer explains how listening to teachers' needs generated a program that benefits both teachers and students.

**by Leslie Sears Gordon, Fairbanks, Alaska, North Star Borough School District**

Professional development based on teachers' goals and needs was our objective in 1995 when we began the Partners in Science project in the Fairbanks North Star Borough School District. However, we had a great deal to learn about how to provide it.

Initially, the focus of the project was on the use of technology and the involvement of professionals from universities, science agencies, or industry, known as "partner professionals," in the classroom. During the first year, teachers used computers for word processing and struggled with Internet research; partner professionals were used as one-time guest speakers. When technology got in the way of learning and the partner professionals had little impact on participants' classrooms, we were forced to rethink both our goals and strategies.

During the project redesign, we listened carefully to the needs expressed by the 52 participating teachers. They identified content support from professionals, collaboration time, learning communities, and best-practice exploration as the most crucial aspects of their professional development. Here is how we provided each through the redesigned Partners in Science project.

## Support from Math, Science, and Engineering Professionals

Teachers wanted interaction with math, science, and engineering professionals, and local employers encouraged their professional staff to use work time to volunteer in classrooms. The role of the Partners in Science project staff became selecting partner professionals for each teacher and arranging time for collaboration. Once they got started, the teacher and the partner professional determined the direction their partnership took.

In elementary classrooms, partner professionals usually worked as generalists, providing science and math content support both in the classroom and over email throughout the year. Secondary teachers chose to employ their partner professionals during the units for which they had special expertise. Students had regular direct contact with scientists via email. In some cases, they worked together over several years and developed lasting relationships.

## Time to Collaborate on Relevant Goals

Project teachers spoke clearly about the need to have professional development that was relevant, ongoing, and long-term. The teachers felt that the most important need was time to work with their partner scientists and other teachers outside the classroom.

Through NSF funding, Partners in Science provided project teachers with substitutes for seven days per year. The teachers used the project workdays to explore a variety of current best practices.

## Development of Learning Communities

With the additional time to collaborate, the teachers, Partners in Science staff, and scientists developed into a learning community. The structure and content of each project workday was determined by feedback from the teachers through journals, surveys, needs assessments, and so on.

Teachers were encouraged to discuss their ideas and take risks in a nonjudgmental environment. They defined personal goals and attained them through strategies such as action research, focus groups, observing other teachers, and grant writing.

## Exploration of Best Practices

Teachers used part of each project workday to explore and apply current best practices in math, science, and technology. They studied:

- Standards—teachers developed one or two units each year that were based on the Alaska Standards.
- Inquiry learning—teachers explored aspects of inquiry learning and integrated many of them into their units.
- Alternative assessment—units were evaluated through methods such as performance assessment, projects, demonstrations, and constructions.
- Learning cycle model—lessons followed a format that included assessment of students' prior knowledge, opportunities to explore materials and phenomena, discussions for concept development, and opportunities to apply what was learned.
- Global Learning Observations to Benefit the Environment (GLOBE) program (www.globe.gov)—teachers were trained in the basic GLOBE protocols and provided with instrument kits so that they and their students could conduct long-term research in their local environments.
- Appropriate uses of technology—teachers challenged themselves to use technology when it was the best strategy to support learning rather than as an end in itself.
- Teaching and assessing diverse learners—teachers explored multiple intelligences (Gardner, 1983) and native knowledge and integrated components of each into their units.
- Action research—teachers participated in optional collaborative projects where they identified important issues and problems in their classrooms and systematically explored solutions.

## Six Years of Success

After six years of learner-centered professional development, Partners in Science teachers are continuing their own professional development and need less guidance from project staff. The following journal entry is representative of the reactions of many of the project teachers.

> *I feel professional, inspired, exemplary, on the cutting edge, breaking the molds. I am more confident in what I do. Teaching this way with Partners continues to keep me going because I see so much more success in my students than I did when I was just a "regular" sort of teacher. Together, the kids and I work as a team to improve ourselves. They see me make mistakes, regroup, and try again. I really feel that they find the environment inviting to risk taking.*
>
> —Teacher journal entry, 1999

Teachers' comments such as this have been gathered throughout the project. Such reactions suggest that careful integration of ongoing, learner-centered professional development provides the support necessary for most teachers to improve the learning environment in their classrooms.

*Leslie Sears Gordon served as co-principal investigator in charge of staff development and evaluation for Fairbanks North Star Borough School District's Partners in Science project from 1995-2001. Now retired, Gordon was a teacher and staff developer for the district. She received the Presidential Award for Excellence in Science Teaching and the Milken National Educator Award.*

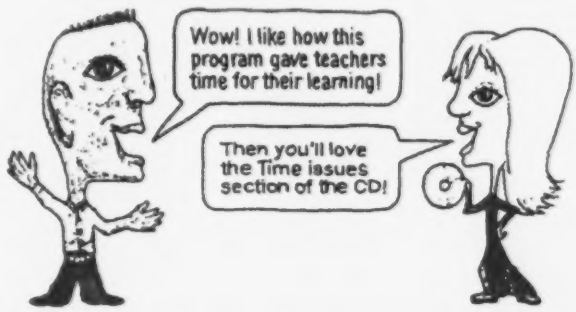
*The Partners in Science project was funded by the National Science Foundation.*

**References**

Alaska Department of Education. (1996). *Alaska Standards: Content and Performance Standards for Students.* Juneau, AK: Author.

Fullan, M.G. & Miles, M. (1992). Getting Reform Right: What Works and What Doesn't. *Phi Delta Kappan, 73*(10), 745-752.

Gardner, H. (1983). *Multiple Intelligences: The Theory in Practice.* New York: Basic Books.



# Student Work Around the World

This multinational program uses student work to help teachers build on data from the Third International Mathematics and Science Study (TIMSS).

**by Erma Anderson, Schools Around the World, Washington, D.C.**

Schools Around the World (SAW) is a multinational professional development program of the Council for Basic Education. Nine nations or regions—Australia, Czech Republic, France, Germany, Hong Kong SAR, Japan, Portugal, the United Kingdom, and the United States—currently participate in the program. Participating teachers learn to recognize successful teaching by analyzing actual student work from science and mathematics classes.

SAW believes that teachers need to be part of a global conversation about what constitutes excellence in teaching and learning and how it can be achieved. Through in-school professional development workshops, online seminars, and an interactive database, teachers participating in SAW can study the work of teachers and students in countries that performed well on the Third International Mathematics and Science Study (TIMSS). They also submit "cases" of their own students' work for analysis.

A case consists of three samples of student work (one that meets the teacher's expectations, one that exceeds expectations, and one that does not yet meet expectations). The case also provides information about the context of the assignment, including the standards addressed and the assessment strategy.

## Learning to Analyze Student Work

SAW has developed a sequence of activities using peer collaboration to help teachers analyze student work. In a full-day orientation session, participants go through a four-part process:

**Part 1.** Teachers complete an actual classroom assignment given by a SAW teacher. Participants discuss their experience in doing the assignment and reflect on the content. Teachers also ask themselves what evidence they would need to see in student responses to the assignment to determine if students understood the content.

**Part 2.** Participants study samples of student work on the same assignment. Teachers reflect on the intellectual rigor of the students' work and discuss how they would assess the work. Part of that process is identifying how the samples of student work meet expectations, exceed expectations, or do not yet meet expectations.

**Part 3.** Participants reflect on the assigning teacher's assessment of the student work, paying particular attention to whether the assessment fits the learning goals of the assignment.

**Part 4.** Teachers connect this example of teaching and learning to their own practice.

After completing the orientation session, teachers participate in a five-week online seminar. Participants have opportunities to share student work from their classrooms and to analyze samples of national and international student work. Teachers learn to find evidence that students understand and synthesize the knowledge, skills, and concepts addressed in the assignments.

The online seminar is followed by a student work symposium. This full-day workshop is an opportunity for teachers to present student work from their own classrooms and to use the SAW process for collaborative peer review.

Online or in person, teachers in the SAW program share the common experience of reviewing student work from their own classrooms and other classrooms around the world. In so doing, they become a part of an international community of teachers interested in helping students understand mathematics and science.

SAW is developing additional online seminars on assessment and pedagogy as well as other opportunities for teachers to examine student work with colleagues, nationally and internationally.

*Erma Anderson is the science and math consultant with Schools Around the World.*

### How to Participate in Schools Around the World

Any mathematics or science teacher can become a participant in the Schools Around the World (SAW) process. First you are asked to complete an orientation and to share cases of student work for reflection. The next step is becoming a SAW associate with access to the database of international student work.

Associates may participate with a group of three or more colleagues. The ideal approach is to involve an entire school or district. SAW is designed to work in combination with existing school or district professional development programs.

In 2001, workshops were held in school districts in California, South Carolina, and Virginia. For further information on district programming, email SAW (sawinfo@c-b-e.org ). For information about becoming a SAW associate, visit the web site (www.edc.org/CCT/saw2000) or call 202-347-4171.

SAW is supported by a number of major foundations and the U.S. Department of Education.

## *Focus on the* Collection

This section presents highlights from the full ENC record for exemplary resources selected to illustrate this issue's theme.

**ENC's Collection and Catalog**

ENC's collection of mathematics and science resources—the most comprehensive in the nation—is housed in our online repository with new items added daily. We collect material from federal and state agencies, commercial publishers, professional organizations, school districts, and individuals. The collection includes print materials, software and CD-ROMs, kits, and manipulatives, along with hundreds of excellent Internet sites.

All materials are cataloged by ENC, and the catalog records are searchable from our web site (enc.org). Part of each catalog record is a detailed description of the resource written by ENC experts in mathematics and science education. These descriptions are not evaluative reviews, but the online record does include references to reviews, awards, and other evaluative materials.

# Resources for Designing Your Own Professional Learning

**by Carol Damian and Terese Herrera, ENC Content Specialists**

When we consider what it means to design professional learning for science and mathematics educators, we think the most important factor is the learner. By "learner" we mean both the teacher and the student. What does the teacher need to know and be able to do so that professional development experiences pay off in the classroom with maximum benefits for students?

We asked teachers what kinds of professional development experiences were most beneficial to them. Here are a few things they told us:

> *Being able to identify your own and your students' needs and seek out ways to learn how to meet those needs...*
>
> *Something that we do for ourselves—not "have done to us"...*
>
> *Professional learning can't be a one-time shot that supposedly fixes our problems; it must be ongoing and developmental...*
>
> *Useful professional development can be in many forms (but chosen by us for specific purposes), such as university classes, workshops, lectures, seminars, online information or courses, field trips, study or discussion groups, mentors, peer collaboration or coaching, and other imaginative ways to enhance our teaching practice...*
>
> *Useful professional development can be about improving content knowledge, learning new teaching strategies and ways to communicate, talking about issues, or gaining insight into educational research...*

We kept these comments in mind, as well as the structure of the CD-ROM, as we selected items from the ENC Collection for this issue. We looked for materials that could help you, as mathematics and science teachers, develop a plan for your own ongoing learning. We've also included ready-to-use materials for workshops and materials that you can use as you help build a learning community within your school.

As we chose items, we used the national mathematics and science standards as well as research-based principles of professional development as our guides. We selected resources for exploring inquiry and innovations in teaching and learning, as well as for implementing standards in your classroom.

We also included materials about how students learn and what current research says about the indicators of effective instruction. Finally, we selected some outstanding items from the ENC Collection that offer insight into additional strategies for designing professional development.

We realize that every teaching situation is unique. Likewise, your professional needs are unique and can only be identified by you. We have chosen quality items that, in our judgment, show much promise for supporting whatever plan you design for your professional learning.

**We cannot possibly include in this list all of the items from the ENC Collection that would be useful in designing your own professional learning. We invite you to visit the ENC web site (enc.org) to search further for outstanding resources.** **See page 63 for search tips.**



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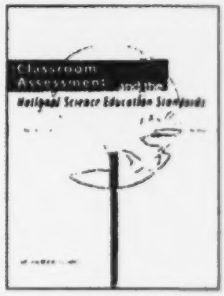
# Featured Resources

## Get started... Introductory readings and activities


64 Before It's Too Late: A Report to the Nation from the National Commission on Mathematics and Science Teaching

64 Blueprints: A Practical Toolkit for Designing and Facilitating Professional Development

64 Classroom Assessment and the National Science Education Standards



65 Designing Professional Development for Teachers of Science and Mathematics

65 Ideas That Work: Mathematics Professional Development

65 Ideas that Work: Science Professional Development

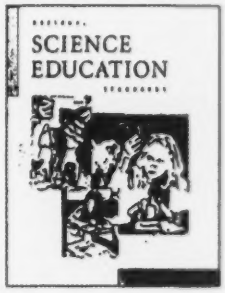
66 Illuminations: Principles and Standards for School Mathematics

66 Inquiry and the National Science Education Standards: A Guide for Teaching and Learning

66 The National Board for Professional Teaching Standards

66 National Science Education Standards

67 NSTA Pathways to the Science Standards: Guidelines for Moving the Vision into Practice



67 Practice-Based Professional Development for Teachers of Mathematics

67 Principles and Standards for School Mathematics

68 Professional Development Leadership and the Diverse Learner

68 Professional Development in Learning-Centered Schools

69 Professional Development: Learning from the Best

69 Professional Development: Planning and Design

69 Professional Standards for Teaching Mathematics

70 Revisioning Professional Development: What Learner-Centered Professional Development Looks Like

70 Standards for Staff Development, Revised

70 Why Can't We Get It Right: Professional Development in Our Schools


## Build a foundation... Issues to consider as you learn


71 The Adaptive School: A Sourcebook for Developing Collaborative Groups

71 Awakening the Sleeping Giant: Helping Teachers Develop as Leaders

71 Complexities of Collaboration, with Marilyn Friend

72 Developing and Supporting Teachers for Science Education in the Middle Years

72 Empowering Teachers: What Successful Principals Do

72 Improving Schools from Within: Teachers, Parents, and Principals Can Make the Difference

73 Learn & Live

73 Professional Learning Communities at Work: Best Practices for Enhancing Student Achievement

73 Staff Development: Practices That Promote Leadership in Learning

74 Teacher Leadership in Mathematics and Science: Casebook and Facilitator's Guide

74 Teachers Transforming Their World and Their Work

74 Teaching Mathematics to the New Standards: Relearning the Dance

75 Using Data, Getting Results: A Practical Guide for School Improvement in Mathematics and Science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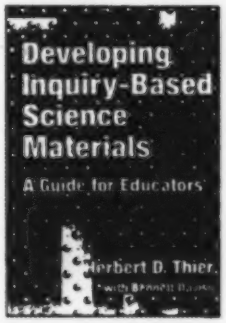


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**91** Teaching Workshop 2: Elementary Math

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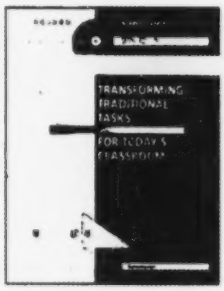
**92** Training Mentors Is Not Enough

**92** Transforming Traditional Tasks for Today's Classroom

**92** What's Happening in Math Class? Volumes 1 and 2

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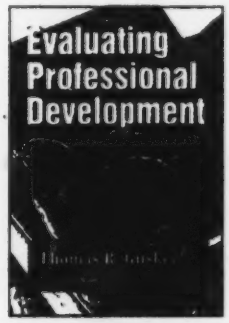
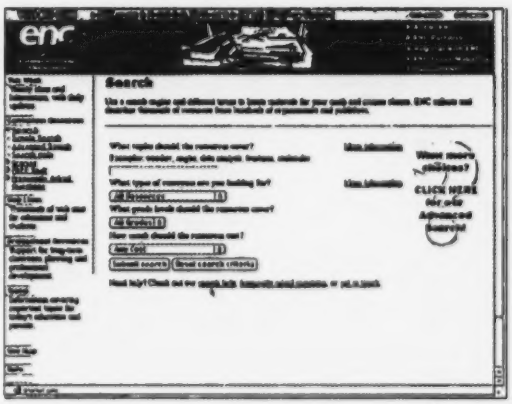



# Searching the ENC Collection of Resources

The resource descriptions printed in this magazine are abbreviated versions of the full catalog records available online. You can access ENC's vast collection of curriculum resources by visiting ENC Online (enc.org).




## To find the online record for resources featured in *ENC Focus*:

The easiest way to browse the online records of resources featured in an issue of *ENC Focus* is to go to our web site (enc.org) and select the link in the top right corner to ENC Focus Magazine. Select the title of the appropriate issue, then scroll down to the Focus on the Collection section. Finally, follow the links to the records of your choice.

## To find other resources:

When you visit ENC Online (enc.org), the Curriculum Resources section in the left navigation bar offers both a simple and an advanced search with help features for each. The advanced search allows you to choose particular subject words, grade level, cost, and type of material to find exactly what you need.

For example, materials for this magazine were found through the use of subjects such as professional development, mentoring, using data, teacher leadership, case studies, reflective practice, and collaboration.

Also in the Curriculum Resources section is the Browse option. Find the subject you are interested in. Once a first page of results is returned, you can use the "Customize using advanced search" feature to further limit your search.

Additional assistance is available online (enc.org/resources/search/help) or by contacting the ENC Information Services staff by email (library@enc.org) or phone (614) 292-9734.



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# Get started...
# Introductory readings and activities

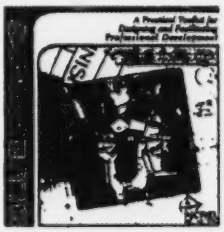
## Before It's Too Late: A Report to the Nation from the National Commission on Mathematics and Science Teaching

www.ed.gov/inits/Math/glenn/report.pdf
Grades K-12
2000
Author: U.S. Department of Education National Commission on Mathematics and Science Teaching for the 21st Century

This electronic document contains the final report of the National Commission on Mathematics and Science Teaching for the 21st Century. It states that America's students must improve their performance in mathematics and science if they are to succeed in today's world and if the United States is to stay competitive in an integrated global economy. This report indicates that the way to improve the performance of students in mathematics and science is through better teaching. Problems interfering with improvement are identified and discussed. Some characteristics of high quality teaching are listed. Three goals for improvement are presented along with action strategies. The first goal is to establish an ongoing system to improve the quality of mathematics and science teaching in grades K-12. The second goal is to increase the number of mathematics and science teachers and improve the quality of their preparation. The third goal is to improve the working environment for K-12 mathematics and science teachers. The report concludes with ideas for what everyone, including parents, businesses, institutes of higher learning, state leadership, and school boards, can do to aid in the attainment of these goals. (Author/JAR) ENC-019982

## Blueprints: A Practical Toolkit for Designing and Facilitating Professional Development

Grades K-12
2000
Author: North Central Eisenhower Mathematics and Science Consortium at NCREL



This CD-ROM contains materials to help schools, districts, and other providers design and facilitate effective professional development for math and science educators. Designed to provide structure and strategies that engage people in professional development collaborations, the materials include nearly 80 activities, 22 group processes, and more than 300 print and multimedia resources as well as scenarios and templates. The activities are divided into the areas of professional development, curriculum, instruction, and assessment. For each area, video footage shows teachers discussing the importance of the issues involved in that group of activities. Users can reach the activities from scenarios or from a list organized by area. The activities are written as facilitator's notes and include their purpose, prerequisites, and descriptions. Hyperlinks take the user to related activities or other related resources available on the CD-ROM. For example, an activity to help participants analyze and refine performance assessment uses the task of cleaning a bedroom as its focus while the participants consider the difficulty of measuring its cleanliness. Hyperlinks connect the user to a handout that the participants use to relate their criteria to eight keys for success. After the groups revise their criteria, the user can connect to the group process called 3-2-1 Reflection, which facilitates the participants' learning reflections about the activity. The group process has links to illustrations showing the room layout and the facilitations steps. Users can also customize the 3-2-1 Reflection. The resources on the site are arranged by topic, author, media type, and region. The topics are divided into the activity domains as well as general areas such as equity, standards, and mathematics or science. (Author/JR) ENC-017959

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www.ncrel.org
Free CD-ROM package (Macintosh/Windows)

## Classroom Assessment and the National Science Education Standards

Grades K-12
2001
Author: editors, J. Myron Atkin, Paul Black, and Janet Coffey

This book for prospective and practicing teachers, designed as a companion to National Science Education Standards, discusses how formal and informal assessments can guide and improve pedagogy. Emphasizing the role of teachers as educational leaders, the resource offers a framework for thinking about ongoing, formative assessment and implementing methodologies that link curriculum and evaluation. Issues such as professional development, time allocation, and systemic responsibilities are also addressed. Multiple tables, vignettes, and samples of student work support the text along with organizational cues and a list of references for further information. A sample chapter, "Assessment in the Classroom," discusses the nature of formative and summative assessments and provides reflection questions for teachers to use as they critically analyze their assessment strategies. A look into two classrooms provides readers with a view of how formative assessment takes shape in everyday teacher-student interactions. Teachers conduct student conferences and utilize questioning techniques to develop further understanding, while students reflect on their learning through journals and peer discussion. Throughout the process, three questions continually emerge: Where are we now? Where are we trying to go? How can we get there? Feature boxes define key terminology and give examples of how student heat experiments can be evaluated constructively. In addition, the necessity for student participation, consistency, and equity is highlighted. (Author/JG) ENC-019792

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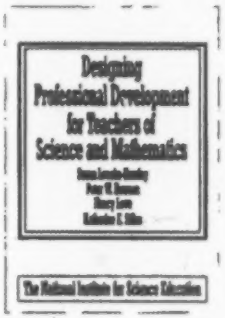
$16.50 per book when ordering 2-9 copies
$13.95 per book when ordering 10 or more copies

## Designing Professional Development for Teachers of Science and Mathematics

Grades K-12
1998
Author: Susan Loucks-Horsley, Peter W. Hewson, Nancy Love, and Katherine E. Stiles




This resource book, written for professional developers of inservice training for mathematics and science teachers, offers a framework for professional development that is a dynamic decision-making process rather than a static set of models. This process can be used to design new programs or analyze and improve existing programs. Classroom vignettes illustrate how professional development programs can help math and science teachers meet the demands of increasingly diverse student populations, master higher, more specialized knowledge, and help students achieve more stringent learning goals. In a sample chapter, fifteen specific strategies for professional learning are explored, including immersion into inquiry work, examining case studies, and mentoring. Detailed information about the time commitment, administrative support, and resources necessary for implementation of the fifteen learning strategies is included. A later chapter uses the initiatives of experienced professional developers to illustrate the process of designing a professional development experience: who is involved and how a plan is developed, implemented, monitored, and adjusted. The resource chapters at the end of the book detail five professional development programs providing an in-depth look at professional development initiatives designed and conducted by the book's collaborators. Extensive references are also included. (Author/JRS) ENC-012228

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$74.95 per book (hardcover)

## Ideas That Work: Mathematics Professional Development

enc.org/records/017918
Grades K-12, post-secondary
1998
Author: Eisenhower National Clearinghouse

This guide characterizes professional development as the bridge between where prospective and experienced educators are now and where they will need to be to meet the challenges of guiding all students to learning more challenging mathematics. The book, *Designing Professional Development for Teachers of Science and Mathematics* by Susan Loucks-Horsley (1998), is the source for the material in this guide. The guide is designed for anyone interested in breaking with the traditional schemes for professional development and exploring new designs for learning. It aims to provide structure to those with responsibility for designing or conducting professional development programs or initiatives. The goal is to show how successful professional development practices need to be rooted in a five-part foundation. This foundation must have a concern for students and their learning at its core, while also increasing teacher knowledge of math content, and developing an active teacher learning style. The authors further believe that strategies for effective professional development must apply a sequential four-step process that begins with goal setting and ends with reflection on and evaluation of what happened. Outlined are descriptions of 15 successful strategies for professional development that include, for each strategy, the elements necessary for its design and implementation, issues to be considered, and a real-life example of the strategy in action. Also found are longer descriptions of existing programs that effectively apply several of the strategies. Contact information for organizations and professional development projects that are working to offer educators training and information are included. (Author/JRS) ENC-013274

Also available online. Search the ENC web site under ENC-017918.

Ordering Information
Eisenhower National Clearinghouse, 1929 Kenny Road, Columbus, OH 43210
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editor@enc.org
Free book

## Ideas that Work: Science Professional Development

www.enc.org/professional/ideas/science
Grades: K-12
1998
Author: Eisenhower National Clearinghouse

This web site, developed for K-12 teacher educators and program developers, describes principles and strategies for designing professional development programs to help teachers learn more challenging science content and how to teach it. The site is divided into five sections. In Section I, the authors identify five principles of professional development that place students and their learning at the core and emphasize the imperative of increasing teacher knowledge of science content and designing programs that engage teachers in active learning. The authors also propose a sequential four-step process of goal setting, planning, action, and reflection. Section II describes a repertoire of 15 strategies for professional development that can be combined in different ways to maximize diverse learning goals. These strategies include experiences that immerse teachers into the world of science and scientific inquiry, providing opportunities to experience high-quality curriculum materials, and involving teachers in action research to examine their own teaching and their students' learning through descriptive reporting, collegial sharing, and reflection. Additional strategies include case discussions of actual teaching situations, examining student work to judge the quality of learning, and developing support networks through study groups, mentoring, and partnerships with scientists. The description of each strategy includes a discussion of elements necessary for design and implementation, issues for educators to consider, and a real-life example of the strategy in action. Sections III and IV features descriptions of additional programs, with full contact information, and Section V furnishes a list of organizations that offer educators professional


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training and information. The principles, design framework, and strategies for professional development described in this publication are elaborated in *Designing Professional Development for Teachers of Science and Mathematics* by Susan Loucks-Horsley. (Author/LCT) ENC-016487

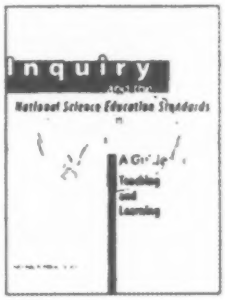
## Illuminations: Principles and Standards for School Mathematics

www.illuminations.nctm.org
Grades: PreK-12
2000
Author: Sam Woebbes
Publisher: National Council of Teachers of Mathematics

This web site, created by the National Council of Teachers of Mathematics (NCTM), provides online information and activities to support and demonstrate how the new mathematics standards, Principles and Standards for School Mathematics (PSSM), can be applied in the classroom. The site is divided into four grade bands: preK-2, grades 3-5, grades 6-8, and grades 9-12 along with an additional area, Across the Grades. A sample section called i-Math features ready-to-use online interactive mathematical investigations for students; these include teacher notes, discussion questions, and connections to pages of the PSSM. In an activity for preK-2, students work with an online LOGO application to find the shortest path for a turtle to walk to a pond. Students create simple programs to direct the turtle's movements as they explore the effects of direction, distance, and angle commands on the turtle's path. In another activity, designed for grades 9-12, multiple applets are presented to allow for experimentation with linear regression, the line of best fit, the effects of outliers, and the meaning of the correlation coefficient. Other sections of the Illuminations web site offer video vignettes of classroom activities to promote discussion, Internet resources offering mathematics background information and support for the implementation of the PSSM, lesson plans for each grade band, and a searchable, interactive version of the updated NCTM standards. (Author/JRS) ENC-016955

## Inquiry and the National Science Education Standards: A Guide for Teaching and Learning

Grades PreK-12
2000
Author: National Research Council (NRC)




This guide, the first of the planned addenda to the National Science Education Standards (NSES), was written to discuss the meaning and multiple roles of inquiry in the classroom, summarize the research and scholarly writings that argue for the value of inquiry in science education, and identify actions that need to be taken to support inquiry in the classroom. The guide was developed to improve teaching and learning, explain and promote inquiry-based methods, improve teacher education experiences, and guide scientists' work with teachers. It describes where inquiry is found in the NSES, discusses classroom assessments, and answers frequently asked questions about inquiry methods. Vignettes of teachers and students engaged in and learning about inquiry are used to illustrate ideas in the text. The appendixes elaborate on excerpts from the NSES and explain how to use worksheets when selecting instructional materials that promote inquiry. Black and white photographs showing students involved in scientific inquiry are found throughout the book. The guide contains a bibliography of resources for teaching science through inquiry. (Author/JR) ENC-017490

Also available online. Search the ENC web site under ENC-018105.
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National Academy Press (NAP), Lockbox 285, 2101 Constitution Avenue NW, Washington, DC 20055
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www.nap.edu
$21.95 per book (paperback)

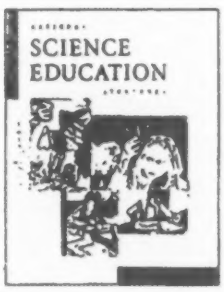
## The National Board for Professional Teaching Standards

www.nbpts.org
Grades K-12
2001
Author: National Board for Professional Teaching Standards

This web site contains information to support the National Board for Professional Teaching Standards (NBPTS) certification process for teachers of grades K-12. The National Board has established a framework of standards and certificates, classified by developmental level and subject area such as Middle Childhood/Generalist, Adolescence and Young Adulthood/English Language Arts. The mission of the National Board is to establish high and rigorous standards for what accomplished teachers should know and be able to do, to develop and operate a national voluntary system to assess and certify teachers who meet these standards, and to advance related education reforms for the purpose of improving student learning in American schools. For individual teachers, NBPTS standards provide a career-long learning curriculum for accomplished teaching. The yearlong certification process involves a series of performance-based assessments that include teaching portfolios, student work samples, videotapes, and thorough analyses of the candidates' classroom teaching and student learning. Teacher candidates also complete a series of written exercises that probe the depth of their subject-matter knowledge, as well as their understanding of how to teach those subjects to their students. This site features a Candidate Resource Center and a searchable database of current National Board certified teachers. (Author/JRS) ENC-019498

## National Science Education Standards

Grades K-12
1996
Author: National Research Council




The National Science Education Standards, developed for grades K-12, present a vision of a scientifically literate populace and are guided by the following principles: science is for all students, learning science is an active process, school science reflects the intellectual and cultural traditions that characterize the practice of contemporary science, and improving science edu-

cation is part of systemic education reform. The standards describe an educational system in which all students demonstrate high levels of performance, in which teachers are empowered to make the decisions essential for effective learning, and in which supportive educational programs and systems nurture achievement. The document consists of an introduction including goals for school science, underlying principles, perspectives and definitions, suggestions for organization, and six categories of standards. The standards cover the topics of science teaching, professional development, assessment, science content, science programs, and systems and describe the conditions necessary to achieve the goal of scientific literacy for all students, including opportunities for students to learn and for teachers to teach. These standards, organized by grade clusters (K-4, 5-8, and 9-12), define content to include inquiry; the traditional areas of physical, life, and Earth sciences; connections between science and technology; science in personal and social perspectives; the history and nature of science; and unifying concepts and processes. Samples and vignettes are provided throughout the document. References are provided for each standard. (Author/KSR) ENC-006101

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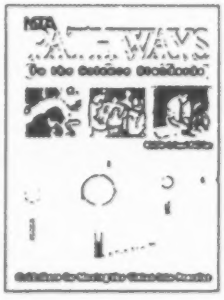
## NSTA Pathways to the Science Standards: Guidelines for Moving the Vision into Practice

Grades: 5-8
1998
Author: editor, Steven J. Rakow




This book, developed for middle school science teachers (grades 5-8) by the National Science Teachers Association (NSTA), contains suggestions for implementing the National Science Education Standards (NSES, 1995) into the classroom. The first three chapters discuss the teaching, professional development, and content standards that apply to all K-12 teachers, and provide examples specific to the middle school teacher. Each chapter features a list of the Standards and a chart highlighting the shifts in emphasis envisioned by the Standards, as well as practical discussions about each standard and a bibliography of relevant articles, most of them from *Science and Children*, *Science Scope*, and *The Science Teacher*. The fourth chapter covers the science content outlined in the NSES for students in grades 5-8. The Content Standards have been clustered in three sections: physical science, life science, and Earth and space science. For each discipline, the book includes examples of inquiry, science and technology, personal and social perspectives, and history and nature of science, integrating them within the disciplines rather than devoting separate sections to them. The text also contains vignettes from exemplary programs. The last two chapters discuss national standards for the science program and the educational system. A brief history and an outline of the NSES are provided in the appendices. (Author/LCT) ENC-014471

Also available are NSTA Pathways to Science Standards (grades K-4) (ENC-012124) and NSTA Pathways to Science Standards (grades 9-12) (ENC-004853).
Ordering Information
National Science Teachers Association, Publications Sales, PO Box 90214, Washington, DC 20090
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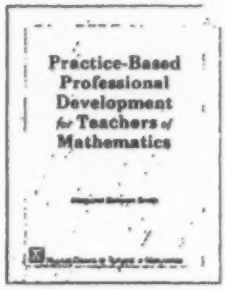
www.nsta.org
$34.95 per book (paperback)

## Practice-Based Professional Development for Teachers of Mathematics

Grades K-12
2001
Author: Margaret Schwan Smith




This book presents a guide for designing, conducting, and evaluating an effective professional development experience for mathematics teachers. It aims to improve student learning through analysis of real situations by connecting ongoing professional development with actual teaching. It emphasizes that changes in deeply held beliefs, knowledge, and habits of practice are required of teachers for any program of professional development to be effective. The book uses a reform-based approach built on a foundation of the best qualities, as identified by the author, of existing effective programs for professional development. Such qualities include assisting teachers to learn new mathematical topics relevant to classroom styles, helping teachers understand students' mathematical thinking, and developing and maintaining intellectually productive social interactions to facilitate students' learning of key mathematical ideas. The opening chapters give ideas for initial assessment questions that determine students' strategies for solving problems and suggest how this information can be used to plan instruction. The majority of the book then gives examples of existing practice-based professional development, outlines a method to design similar high-quality experiences, and provides ways to accurately assess the effectiveness of professional development. Included are references, additional resources, and reviews of selected resources. (Author/SB) ENC-019624

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www.nctm.org
$19.95 per book (paperback)

## Principles and Standards for School Mathematics

enc/records/017737
Grades PreK-12
2000
Author: Kathleen Brazil

This volume, developed by the National Council of Teachers of Mathematics (NCTM), is intended to be a resource and guide for all who make decisions that affect the mathematics education of students in preK-12. It presents a vision of



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school mathematics based on the belief that all students should learn important mathematics concepts and processes with understanding. This full color presentation of Principles and Standards of School Mathematics (PSSM) builds on NCTM's three previous standards documents and reflects input from many groups and individuals in its development. PSSM is divided into six principles and 10 standards. The six principles for school mathematics address overarching themes: equity, curriculum, teaching, learning, assessment, and technology. These principles describe the particular features of a high-quality mathematics education and are offered as guides and tools for decision making. The 10 standards for school mathematics are designed to be descriptions of what mathematics instruction should enable students to know and do. The five content standards are number and operations, algebra, geometry, measurement, and data analysis and probability. The five process standards are problem solving, reasoning and proof, communication, connections, and representation. All standards are presented by grade bands: preK-2, grades 3-5, grades 6-8, and grades 9-12. Each standard comprises a small number of goals that apply across all grades, with the content standards offering an additional set of expectations specific to each grade band. The presentation of the standards is highlighted with examples of student work and examples from the classroom told in the words of teachers. The Table of Standards and Expectations in the appendix highlights the growth of expectations across the grades. The table presents a concise summary of expectations related to each content standard arranged by grade band. Also found is a preK-12 overview summary of expectations for the process standards. References are included in PSSM. (Author/JRS) ENC-017582

Also available online. Search the ERIC web site under ERIC-017737.
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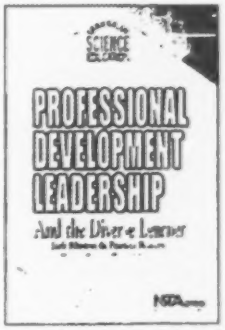
## Professional Development Leadership and the Diverse Learner

Series: Issues in Science Education
Grades K-12
2001
Author: editors, Jack Rhoton and Patricia Bowers




This collection of essays, developed as part of the Issues in Science Education series, discusses the nature of professional development for science educators. Topics address the need for content knowledge and pedagogical mastery as well as the importance of establishing a collaborative network. Informal education and equity issues are also highlighted. Example programs such as North Carolina's Fund for the Improvement and Reform of Schools and Teaching, the Technical Assistance Academy for Mathematics and Science Services, and Informal Learning Science Centers are used to define the ways in which educational reform can be implemented. Figures and tables support the text along with a guided index. A sample chapter focuses on the issues of multiculturalism and equity in science education. Key assumptions describe multiple perspectives and offer insight into the change process. Accompanying vignettes contain fictional accounts created by the authors that illustrate what these assumptions might mean in practical terms. For instance, the first assumption is the iceberg view of culture. Like an iceberg, only the tip of a classroom culture is usually emphasized while the larger portion of surface area remains hidden. A vignette explains what happens when a third grade teacher is unaware of the cultural aspects below the tip of the iceberg. Other assumptions involve visualizing science education goals as a pipeline, border crossing into science, and the notion of scientific literacy. (Author/JG) ENC-019634

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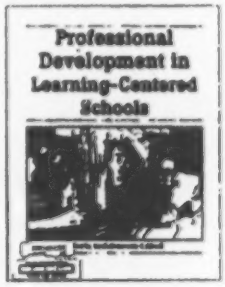
## Professional Development in Learning-Centered Schools

Grades K-12
1997
Author: Arthur L. Costa, Bruce Wellman, Dennis Sparks, Fred H. Wood, Jim LaPlant, Jan C. Marshall, Kathie Tyner, Laura Lipton, Margaret A. Arbuckle, Michael G. Fullan, Randy Schenkat, Sarah DeJarnette Caldwell, Steven R. Thompson, and Thomas R. Guskey




This book of essays on professional development, written primarily for educators, reports on the emerging thinking in staff development and organizational learning in schools and districts. In the first chapter, Dennis Sparks examines how, in the last nine years, thinking about staff development has been influenced by the ideas of results-driven education, systems thinking, and constructivism. He also provides a list of some of the important changes that result from the above three influences. Other chapters develop ideas such as professional development within the context of everyday classroom experience, the importance of collaborative learning in staff development, and administrator roles in professional development. The book is organized into four sections that examine the context in which staff development takes place, including the immediate school context as well as the dynamic theoretical context. The second section of the book looks at the new roles that staff development professionals and administrators play. A third section examines the process and content of learning, including an essay on teacher content knowledge. The fourth section examines the systemic changes that must be made to support new views on staff development. One of the chapters looks at the tools that can be used to examine data in order to make decisions. Statistical tools, such as scattergrams and bar graphs, are discussed in terms of their use in the context of school-generated data. (Author/RMK) ENC-012654

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www.nsdc.org
$17.50 per book

## Professional Development: Learning from the Best

Grades K-12
1999
Author: Emily Russel

This guide, written by the North Central Regional Educational Laboratory (NCREL), contains recommendations for designing, implementing, and evaluating professional development (PD) programs. Based on the proposals of winning districts in the National Awards Program for Model Professional Development, the text presents an overall picture of the PD process by providing step-by-step instructions that integrate content knowledge with logistical considerations. Planning templates and checklists offer methods for organizing each stage in the sequence from performing a student needs assessment to keeping the school community informed. A sample section, "Designing Professional Development," begins with a discussion about the common themes that emerged from award-winning proposals. Decisions regarding who should be included and what their contributions will be are cited as necessary precursors to effective program functioning. Planning tables summarize stakeholder responsibilities and accountability measures. There is also a tool for aligning educational goals to student achievement outcomes. Appendices offer research pertaining to effective professional development, profiles of each award-winning district, and a list of resources for further reading. (Author/JG) ENC-019531

Also available online at www.ncrel.org/pd/toolkit.htm
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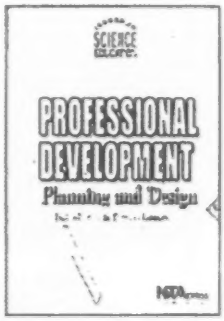
www.ncrel.org
Free book (spiral bound)

## Professional Development: Planning and Design

Series: Issues in Science Education
Grades K-12
2001
Author: editors, Jack Rhoton and Patricia Bowers




This collection of essays, developed as part of the Issues in Science Education series, discusses the nature of professional development for science educators. Topics address the relationship between professional development practices and the National Science Education Standards (NSES) as well as the ways in which organizations have developed effective frameworks for change. Assessment and evaluation measures are also highlighted. Example networks such as the New Professional Teacher Project (NPTP), the National Board for Professional Teaching Standards (NBPTS), and the Eisenhower National Clearinghouse for Mathematics and Science Education (ENC) are used to define the ways in which educational reform can be implemented and maintained. Figures and tables support the text along with a guided index. A sample chapter focuses on introducing teachers to inquiry-based learning and helping them use action research to refine their teaching practices. Two challenges for professional developers are presented that involve turning teachers on to science and helping them view learning through the students' perspectives. Emphasis is placed on engaging teachers in constructivist experiences so that they can see the value within the process and model this approach in their classrooms. There is also a section that addresses the changing role of assessment from an evaluative tool to a more strategic method of curriculum planning. Knowing when to assess, what to assess, and how to embed assessment within the teaching context are cited as key components of effective instruction. (Author/JG) ENC-019635

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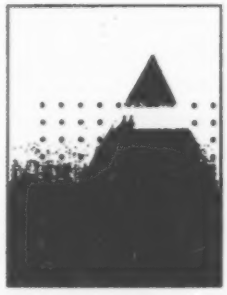
## Professional Standards for Teaching Mathematics

Grades: K-12
1991
Author: National Council of Teachers of Mathematics, National Science Foundation



This document is designed for classroom mathematics teachers and is meant to establish professional teaching standards to guide reform in school mathematics. The standards consist of four components: standards for teaching mathematics, standards for the evaluation of the teaching of mathematics, standards for the professional development of teachers of mathematics, and standards for the support and development of mathematics teachers and teaching. Guides for teaching at different levels are presented in detailed explanations that outline each of the NCTM Standards and in annotated vignettes that are used to provide examples. The vignettes show a range of situations in which good mathematics teaching and learning may take place. Guiding comments in the margin of each vignette focus on the particular standard of teaching being emphasized. The standards for the evaluation of teaching mathematics give guidance to teachers seeking self-improvement, to colleagues mentoring others, and to supervisors and others who are involved in the evaluation of teaching. The standards for the support and development of teachers and teaching highlight responsibilities and ways in which policymakers, schools, school systems, colleges, universities, and professional organizations may support teachers. Following the delineation of the standards, the final section of this document discusses such issues as the role of standards and changing school mathematics that includes networking with other disciplines and research. (Author/VN) ENC-001451

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$31.95 per book (20% discount to NCTM members)

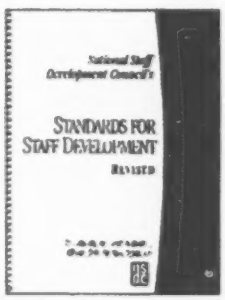
### Revisioning Professional Development: What Learner-Centered Professional Development Looks Like

www.nsdc.org/NPEAT213.pdf
Grades: K-12
1999
Publisher: National Staff Development Council (NSDC)

This electronic document identifies strategies for facilitating learner-centered professional development for teachers. The document is an outgrowth of a conference examining professional development sponsored by the National Partnership for Excellence and Accountability in Teaching (NPEAT), a voluntary association of 29 national educational organizations, and the Learning First Alliance, an association that includes the National Parent Teachers Association. The introduction lists nine research-based principles of effective professional development. One principle calls for professional development based on an analysis of the difference between student performance and the goals and standards for student achievement. Another principle supports the belief that professional development should involve teachers in identifying what they need to learn and in developing the learning experiences in which they will be involved. The document explores three sets of interrelated organizational and political conditions that affect the implementation of learner-centered professional development. These conditions are a supportive school-wide culture and structure, systematic district-level support, and external policies that influence teacher and student learning. Sidebars highlight schools and districts that have implemented change and have become learner-centered professional communities. A chart summarizes the differences between learner-centered professional development and traditional professional development. (Author/JAR/JRS) ENC-020023

### Standards for Staff Development, Revised

Grades: K-12
2001
Author: National Staff Development Council




This book, intended for use by administrators and educators, provides a set of standards for staff development published by the National Staff Development Council. The standards start from the premise that the primary purpose of staff development should be to help educators develop the insights, knowledge, and skills they need to become effective classroom and school leaders better able to increase student learning. The authors take a broad view of staff development and make the case for moving beyond the notion of staff development as confined to workshops, courses, and presentations by experts. There are 12 standards divided into three strands: context, process, and content. As examples of standards contained in each strand, the context strand includes learning communities and leadership, the process strand includes evaluation and collaboration, and the content strand includes equity and family involvement. Each of the standards is accompanied by a two-page discussion that includes a rationale, a case study, discussion questions, references, and practical suggestions for implementation. A questionnaire for users to determine their perception of the current state of staff development in their school is included as an appendix, as is an annotated bibliography providing a guide to other resources. (Author/MM) ENC-019801

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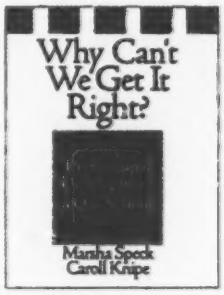
### Why Can't We Get It Right: Professional Development in Our Schools

Grades: K-12
2001
Author: Marsha Speck and Carol Knipe




This professional development resource provides an in-depth guide on how to improve student achievement and learning through the professional development of teachers. The authors claim that the lack of professional development, as well as its misuse by educators, explains the chronic failure of school reform. They then systematically address common concerns facing teachers and administrators in implementing effective professional development. Each chapter presents a short scenario involving teachers and/or administrators that highlights a particular concern and proceeds with an outline to deal with it by focusing on its connection to student learning and achievement. Chapter topics include emphasizing professional development in a standards-based system, developing a learning community where new teachers can comfortably learn techniques from experienced teachers, and designing, implementing, and evaluating a personal plan for professional development. Throughout the book, charts and figures visually summarize chapter ideas. Included are references, bibliography, and numerous web sites for educational resources, educational information, and national reports. (Author/SB) ENC-019647

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www.corwinpress.com
$34.95 per book (paperback)

# Build a foundation... Issues to consider as you learn

## The Adaptive School: A Sourcebook for Developing Collaborative Groups

Grades K-12
2000
Author: Robert J. Garmston and Bruce Wellman

This book, with accompanying facilitator workbook, is designed to support the creation and facilitation of collaborative groups and the development of individual teacher talent to improve student learning. The authors use the word adaptive to mean changing form in concert with clarifying identity. The authors aim to help readers act in an adaptive mode as they develop strong schools in which collaborative faculties are capable of meeting contemporary challenges. The facilitator workbook contains workshop materials that include suggested agendas, handouts, and visuals, along with group building activities which schools and district teams can use as they strive to become increasingly adaptive. Designed as a practical guide for improving school communities from within, *The Adaptive School* is organized into twelve chapters, each of which begins with a box highlighting the chapter's themes. These themes include getting work done, adapting to change, and managing systems, and each is developed over the course of many chapters. For example, the managing systems theme appears in the last four chapters within sections that explore how principles from the field of systems management can be applied to efforts to improve schooling. These last four chapters focus on how to develop an organization's capacity for self-directed learning, how to understand teachers' professional knowledge bases, and how to develop professional capacities for adaptivity. Information includes helping readers determine which interventions can create the greatest change with the least effort. Extensive endnotes are included with each chapter. (Author/JRS) ENC-019394

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$54.95 per book (hardbound)
$22.95 per syllabus (paperback)

## Awakening the Sleeping Giant: Helping Teachers Develop as Leaders

Grades K-12
2001
Author: Marilyn Katzenmeyer and Gayle Moller

This second edition book describes the role of teacher leadership in driving educational reform. Frameworks define the nature of teacher leadership and provide examples of teachers who demonstrate leadership in their schools. The process of developing teachers' leadership skills is explained, emphasizing the necessity of adequate time allocation for planning and collaborating with colleagues. Additionally, the influence of building culture and power relationships is explored. Multiple black and white tables, figures, and organizational cues support the text along with Application Challenges and the Philosophy of Education Inventory (PEI). A sample chapter, "Influencing Others Through Teacher Leadership," discusses the ways in which teacher leaders impact their surrounding environment. Actions include redesigning a professional development program, mentoring new teachers, and modeling instructional strategies. According to the authors, involvement does not guarantee leadership. Teacher leaders need to identify their position within group dynamics and exercise appropriate collaborative skills in order to have influence in their school organization. Tips for teachers to increase their influence include reading educational research and setting goals with action plans for making specific changes at school. (Author/JG) ENC-019641

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## Complexities of Collaboration, with Marilyn Friend

Grades K-12
2000
Author: producers, Leonard Burrello, Marilyn Friend, and Jotham Burrello.
Publisher: National Professional Resources (NPR) Inc

This videotape, developed for K-12 educators, addresses five common dilemmas that arise when teachers work in collaborative teams with special services personnel. These dilemmas include differing expectations, unbalanced responsibilities, and disagreements as well as time management and the challenge of meeting daily demands. Issues are divided into program segments that feature elementary, middle, or high school teachers teaming with special services teachers as they confront a given situation within the school setting. Afterward, participants debrief the experience with host Marilyn Friend to highlight key ideas and communicate thoughts and feelings. A sample segment, Time! Time! Time!, provides suggestions for maximizing collaborative planning time. Time wasters, such as informal conversation, coming late to meetings, and discussing student behaviors that cannot be resolved at school are described along with ways in which collaborators can maintain focus during their time together. Recommendations involve having and sticking with a written agenda and keeping a clear line of communication. Maintaining professionalism, being flexible, and respecting each person's individual pedagogical style are cited as fundamental components of establishing a successful partnership. (Author/JG) ENC-019789

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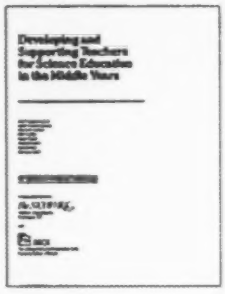
(812) 855-5090 / Fax: (812) 855-4545
$125.00 per video

## Developing and Supporting Teachers for Science Education in the Middle Years

Grades 5-8
1990
Author: Susan Loucks-Horsley, Jacqueline Grennon Brooks, Maura O. Carlson, Paul J. Kuerbis, David D. Marsh, Michael J. Padilla, Harold Pratt, and Kitty Lou Smith




This report, produced by the National Center for Improving Science Education, contains a set of policy recommendations for supporting middle school science teachers. Based on current educational findings, the document is written to help bridge the gap between research, practice, and theory. Areas of focus include teacher beliefs and attitudes about young adolescents, the need for purposeful professional development, and ways in which preservice teachers can become better prepared for the field. Recommendations for curricular integration, a constructivist pedagogical approach, and staff empowerment are explained and supported by the results of the Carnegie Task Force and other educational research agencies. A sample chapter, "Staff Development for Middle Grade Science Teachers," discusses approaches to professional development that foster the acquisition of knowledge, skills, and beliefs through a continuous, dynamic process. In comparison to a one-shot inservice session, effective professional growth is envisioned as the product of continuous evaluation and change. Two case studies are presented to illustrate different development practices and emphasize the critical nature of teacher collaboration and reflection. The role of the school's organizational structure is also addressed. (Author/JG) ENC-019225

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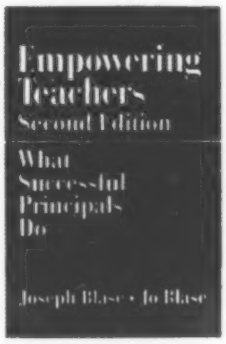
## Empowering Teachers: What Successful Principals Do

Grades 8-12
2001
Author: Joseph Blasé




This book is written for practicing and prospective principals who want to empower teachers. It explains the effects principals can have on teachers' work, based on interviews that gathered the perspectives of over 800 teachers. Information about principals is drawn from a study of highly successful principals of schools affiliated with Carl Glickman's League of Professional Schools. The authors describe what successful principals do—their behaviors, attitudes, and practices—within the framework of shared school governance. This style of school organization is called facilitative-democratic leadership and is seen, by the authors, as the best way to create real school improvement in a democratic society. Shared governance involves teachers and principals working effectively in groups, dealing with conflict, and being focused on the big picture of school reform. This book addresses the question of what effective, facilitative, empowering leadership looks like. There is an overview of professional literature on teacher empowerment and empowering leadership. Strategies for principals to use to build teacher trust and develop instruction-oriented structures that improve schools are described. Ideas are presented for staff development that enhances teachers' instructional capabilities. The need to extend autonomy and encourage innovation is discussed along with the effects of positive personal characteristics of principals. References are included. (Author/JRS) ENC-019625

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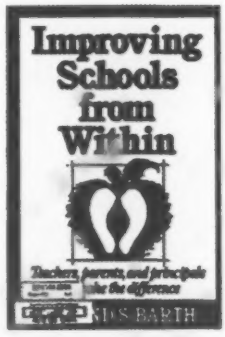
## Improving Schools from Within: Teachers, Parents, and Principals Can Make the Difference

Series: Jossey-Bass Education Series
Grades: 8-12
1990
Author: Roland S. Barth, Laura Saad Guest, and Theodore R. Sizer




This book, addressed to teachers, parents, principals, and anyone interested in educational reform, focuses on the need for communication, collegiality, and risk taking among adults in schools to create an atmosphere of learning. Barth, based on his extensive personal experience as a teacher, principal, and university educator, believes that our nation's schools are capable of improving themselves and that only changes emanating and sustained from within are likely to bring lasting improvements. Topics include the crisis of self-confidence among teachers who may no longer believe they are engaged in a vital cause; problems in teacher-principal relationships that can center around such issues as pupil evaluation, staff organization, and placement of children; and ideas for creating schools that function as communities of learners. The role of the principal in creating a positive learning environment for the school community is developed with ideas for implementing change that include setting clear expectations, empowering teachers with responsibilities that break down isolation, and functioning as the head learner in a community of learners. The author concludes with his personal vision of a good school and offers ideas for implementation. This vision of a good school includes it being a community of learners where there is a recommitment of adults to learning, time to philosophize about the teaching process, respect for diversity, low anxiety, high standards, and a sense of humor. A reference list is included. (Author/JRS) ENC-012398

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## Learn & Live

Grades K-12
1997
Author: Geraldine Wurzburg, Alison DeGerome, George Lucas, Patty Burness, William Snider, Roz Kirby, Randall Duckett, Jane Hartford, and Linda Chion-Kinney

This videotape and accompanying book, produced by the George Lucas Educational Foundation (GLEF), addresses methods to handle issues currently plaguing schools and provides examples of situations in which these methods have been successful. *Learn & Live*, aiming to inspire viewers to join the effort to improve public education, highlights ideas that establish a new vision for what schools should be in the 21st century. The video documentary, hosted by Robin Williams, features footage of students in school settings as well as the comments of national figures in business and education, such as Bill Gates, Howard Gardner, and General Colin L. Powell. The topics discussed are: project based learning, emotional intelligence, school to career programs, interdisciplinary curricula, and schools as community learning centers. One typical segment of the video shows a class working on an entomology unit. Viewers see the students collecting insects, creating multimedia reports, and using two-way fiber optic technology to view their samples through an electron microscope and discuss their samples with an entomologist. The book was written as a tool for those who are ready to begin or are in the process of working to improve schools. It contains ideas, personal stories, and descriptions of programs to outline the range of possibilities. It also has lists of organizations, reading material, and electronic resources for additional information. Individual chapters address issues that impact many aspects of education including student assessment, teacher professional development, and different forms of school and business partnerships. Its appendices contain a glossary and a list of electronic resources to supplement the information in the chapters. Black and white photographs are found throughout the book. (Author/JR) ENC-017965

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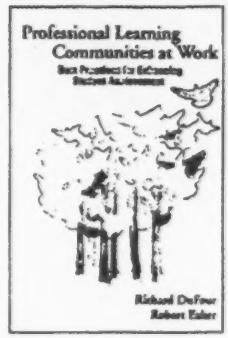
The George Lucas Educational Foundation, PO Box 3494, San Rafael, CA 94912
(415) 662-1600 / Fax: (415) 507-0499 / Toll-free: (888) 475-4371
www.glef.org
$20 per videotape set (1 video and 1 guidebook).
$15.00 per set when part of a group order

## Professional Learning Communities at Work: Best Practices for Enhancing Student Achievement

Grades K-12
1998
Author: Richard DuFour and Robert Eaker
Publisher: National Educational Service

This professional development resource for educators and administrators emphasizes the importance of creating and sustaining professional learning communities for school improvement. The authors contend that the most promising method for bettering student achievement is through sustained school improvement, achieved by developing the ability of school personnel to function as professional learning communities. This book develops this idea by including a model of professional learning communities, supporting the model with research, and contrasting it to the traditional "factory" school environment. The authors identify and examine the building blocks of professional learning communities: mission, vision, values, and goals. They then show how to use these to actively build school improvement and avoid meaningless rhetoric. The roles of parents, teachers, and principals are discussed and an argument is presented for giving teachers a greater voice in curricular decisions. The final chapter emphasizes that patience and persistence are needed when attempting the transformation from a traditional school to a professional learning community, and that this transformation should be an ongoing commitment to continuous improvement rather than a one-time task or project. (Author/SB) ENC-019680

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$24.95 per book (paperback)

## Staff Development: Practices That Promote Leadership in Learning

Series: School Leadership Library Communities
Grades K-12
1999
Author: Sally J. Zepeda

This book uses detailed examples from the field to promote staff development for schools in which the staff members are committed to their own learning as well as that of others. Each of the eight chapters in the book examines an aspect of staff development, such as professional standards, the role of the principal, and methods to promote staff members' ongoing learning. It also discusses the evaluation of staff development and alternative sources of funds to support it. Six staff development models are described to help the readers customize their programs to meet their schools' needs. Sections that highlight the work of principals who are instructional leaders are scattered throughout the book. Case studies are used to give readers an expanded view of successful programs. The book also contains questions to help readers find ways that the information presented in the chapters can be applied to their own situation. As an example of the material, one chapter about job-embedded learning suggests situations in which three attributes (relevance, feedback, and transfer) can occur. A case study describes how a school in Evanston, Illinois, developed and modified a program in which the staff development was built into the school day. It outlines elements essential to the program, such as strong administrative support,

small working groups, and outstanding teachers acting as facilitators. The chapter asks the readers how their schools need to be restructured to provide for job-embedded learning and suggests action research ideas. Each chapter ends with a list of suggested readings. (Author/JR) ENC-017328

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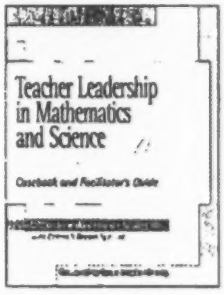
## Teacher Leadership in Mathematics and Science: Casebook and Facilitator's Guide

Grades K-12
2000
Author: Barbara Miller, Jean Moon, Susan Elka, and Deborah Bryant Spencer




This professional development book contains seven case studies that explore teacher leadership in mathematics and science education. Teacher leadership themes include developing expertise, negotiating new relationships, and securing resources and policy support. A case is defined as a story designed and presented to engage those using it to solve a problem, wrestle through a puzzle, discern an underlying principle, or stimulate reflection. The cases in this volume portray dilemmas that exist in complicated, multilayered school situations. These open-ended, field-tested cases, meant to promote inquiry, were developed in teacher leadership programs that include Merck Institute for Science Education and Leader Teacher Institute. Each of the seven chapters consists of a case text and a facilitator's guide. The cases, each readable in ten to fifteen minutes, present situations in which teacher leaders are central players. By reading and working with the text of each case, participants can develop an understanding of the dilemmas that teacher leaders face, as well as the issues they confront. The case facilitation materials include a case summary, a list of two key teacher leadership issues addressed, and sets of activities to help participants, led by the facilitator, work within the case, expand upon the case, and move beyond the case. References are included. (Author/JRS) ENC-019231

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## Teachers Transforming Their World and Their Work

Series: Series on School Reform
Grades: K-12
1999
Author: Ann Lieberman, Lynne Miller

This book, part of the Series on School Reform, seeks to address the contemporary realities of schools and teaching, focusing on both the constraints and the possibilities embedded in teaching practice. These realities are highlighted with examples of the reform process at work in four sample schools. The words and experiences of teachers and principals are used to show what growth and change look like from the inside. A teacher's perspective is offered: what change requires, how differences in context and personnel are accommodated, what people learn as they change, and what it feels like in the process. Change is characterized as the collective involvement of teachers in goals for their school that become larger than their own personal goals for their classroom. This text, an updated sequel to the authors' 1984 book, is designed to be a conceptual roadmap for the personal and institutional change process. Central to school change is the ability and capacity of principals and teachers to make the transition from isolated schools to schools that offer a rich and supportive environment for students and adults. Included are the observations of teachers and principals involved in building professional communities in their schools that demonstrate how teaching practices give shape to values and mission statements, how ideas propel action, and how reflection helps clarify beliefs. This book concludes with eight new understandings about transforming teaching and schooling that include ideas for making professional development integral to school life, why leading and learning are a collective responsibility for teachers and principals, and ways to protect and nurture hope, passion, and commitment in teachers. References are included. (Author/JRS) ENC-015102

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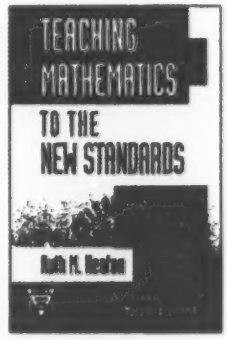
$16.95 per book (paperback)

## Teaching Mathematics to the New Standards: Relearning the Dance

Series: Practitioner Inquiry Series
Grades K-12
2000
Author: Ruth M. Heaton and Magdalene Lampert




This book describes and traces the efforts of a teacher to change her teaching practice in response to current national reforms in mathematics education. It consists of interweaved chapters on theory and practice which follow the teacher through a year of teaching a fourth grade class while working on her doctoral degree. The author attempts to exemplify the phrase teachers as learners by trying to relearn how to teach elementary mathematics in the light of standards-based reform. The author sees herself as moving between the worlds of theory and practice and draws heavily on both of these aspects of her experience throughout the book. In each



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chapter, there are sections describing the theory of, for example, teaching as improvisation interspersed with vignettes of actual classroom experiences, including transcripts of student/teacher dialogues and more general class discussion. In the section on teaching as improvisation, the vignettes involve the author's self reflection on when and how to field questions which are somewhat off topic and how to negotiate the fine line between students competing and students cooperating. The conclusion of the book suggests ways for teachers to become learners as well as suggestions for the training of preservice teachers. (Author/MM) ENC-018293

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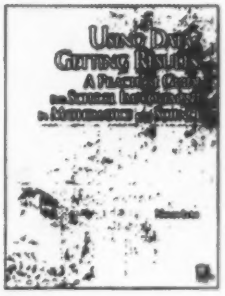
### Using Data, Getting Results: A Practical Guide for School Improvement in Mathematics and Science

Grades K-12
2002
Author: Nancy Love



This resource guidebook with CD-ROM is designed to help teachers, administrators, and community members institute reform in school science and mathematics curricula with a focus on improving student learning. The author believes the same process of inquiry that invigorates classrooms also breathes life into school reform. *Using Data, Getting Results* offers a rationale and a step-by-step guide based on an inquiry approach to systemic school reform. Also included are resources for the collection of data to facilitate the suggested reform process and exemplars of reform in schools throughout the United States. The book starts with a framework for a self-examination process, which the guide advocates as a first step toward institutional reform using an inquiry approach. The following chapter is a systematic description of how data (information about current curriculum design, attitudes of students and teachers, school structure, student performance, etc.) can be used as a lever for change. It also discusses the importance of collaborative inquiry for reform. The next four chapters provide a framework for data-driven systematic reform, which is represented as a physical structure with student learning as the roof supported by three pillars of curriculum instruction: assessment, equity, and critical supports. Critical supports include professional development, school culture, and leadership. These chapters provide guides to collecting and analyzing student learning data, formulating a learner-centered problem, developing a standards-based curriculum, implementing curriculum reform, and overcoming barriers to equity. The guide concludes with examples of reform in action from five different schools where reforms range from an algebra-for-all program to systematic student and teacher self-assessment. The guide contains references and blackline masters for data collection. The accompanying CD features an annotated listing of mathematics and science curriculum materials and the guidebook's Planning Tools and Data Tools sections in electronic format. (Author/MM/JRS) ENC-019824

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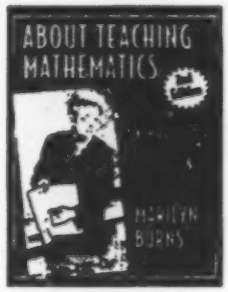
$65.95 per book (paperback) with complementary CD-ROM

## Select learning strategies... Techniques for professional learning

### About Teaching Mathematics: A K to 8 Resource

Grades K-8
2000
Author: Marilyn Burns




This resource book and guide, the second edition, for teachers of mathematics provides more than 240 classroom activities for students in grades K-8. It consists of a rationale for and guide to a problem-solving approach, classroom activities divided into sections on problem solving and arithmetic, and a section on the mathematics behind 40 of the classroom activities. In the opening section on rationale, the author raises what she considers to be topics basic to mathematics teaching, namely: curriculum content, problem solving as the focus of math teaching, the ways children learn, and the place of arithmetic in mathematics instruction. Part II introduces problem-solving activities for every area of the mathematics curriculum including measurement, algebra, patterns, logical reasoning, and number. Part III is concerned with addressing the role of arithmetic in the curriculum and how to teach arithmetic in a way that develops both understanding and skill. Part IV provides discussions of the mathematics behind many of the problems and explains why the solutions make sense. The book also includes a bibliography and blackline masters needed for activities. (Author/MM) ENC-018284

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### The Action Reflection Process: Supporting All Students in Inquiry-Based Science

www.edc.org/AllProcess/ar.htm
Series: Project ASSIST (All Students in Supported Inquiry-Based Science with Technology)
Grades 6-12
2000
Author: Jennifer A. Minocci and Carrie Ehrbar
Publisher: Education Development Center, Inc.

This web site, hosted by the Education Development Center, Incorporated (EDC), explains the Action Reflection Process. In this process a collaborative team composed of classroom teachers, special educators, technology specialists, and curriculum



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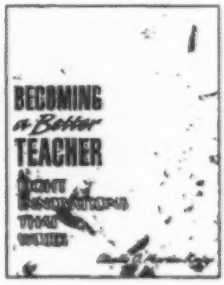
specialists work together to ensure that students with a diverse set of abilities and needs succeed in inquiry-based science education. Teachers who are quoted state that the process helped them build a deeper understanding of children and how to design instruction and assessment to meet students' needs. The site has an example case to show how the different steps of the process work and emphasizes the importance of organizational support from the administration in the development and implementation of the Action Reflection Process. It also outlines the strategies that teachers and librarians have used to support students' learning of science concepts. Data are presented to show how the process has affected students, teachers, and the district. Additional resources, such as references, related web sites, and tools for the Action Reflection Process, are provided. (Author/JR) ENC-018053

### Becoming a Better Teacher: Eight Innovations That Work

Grades K-12
2000
Author: Giselle O. Martin-Kniep




This book, written for K-12 teachers and administrators, discusses eight educational innovations that foster student-centered learning. The use of essential questioning techniques, curriculum integration, and authentic assessment is addressed, as well as the need for scoring rubrics, portfolios, and action research. Recognizing the fundamental nature of teacher beliefs, the author emphasizes the importance of involving teachers in the curriculum reformation process. Multiple examples from different grade levels support the text, along with design modules, templates, and checklists. A sample chapter, "Reflection," explains how teachers can engage students in the self-reflection process. Strategies include creating a safe environment for communication, designing reflective activities that are also purposeful, and providing initiating prompts. Samples of teacher- and student-generated learner checklists are provided, in addition to multidimensional rubrics that evaluate self-awareness, risk taking, and goal achievement. For further research, recommended resources with accompanying synopses are listed at the end of each chapter. (Author/JG) ENC-019308

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### Becoming a Reflective Educator: How to Build a Culture of Inquiry in the Schools

Grades K-12
2000
Author: Timothy G. Reagan, Charles W. Case, and John W. Brubacher

This book, designed for use in teacher education programs, combines case studies with discussions of various central themes related to teaching, professionalism, and reflective practice. The book is offered as a central textbook in a general introductory course in teacher education programs or as a supplementary text in other courses. Each chapter begins with one or more case studies, which are then analyzed and discussed in terms of the chapter's focus. Most chapters end with a series of propositions that are derived from the content of the chapter and offer points for further reflection and discussion. Topics discussed in the book include the nature and purposes of reflective practice, the role of inquiry and professional ethics in reflective practice, and the role of teacher education programs in preparing reflective educators. Additional topics such as democratic schooling, transformative and constructivist curricula, and leadership in the school context are also addressed. Finally, the book suggests activities that are intended to help individuals become more reflective and analytic professionals. Bibliographic references are included. (Author/FCM) ENC-019654

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### A Better Beginning: Supporting and Mentoring New Teachers

Grades K-12
1999
Author: editor, Margo Scherer

This book, written for those interested in creating teaching conditions in which good teachers thrive, is an anthology of articles about methods that educators and schools use to support new teachers. It was compiled as an outgrowth of a theme issue of *Educational Leadership*. The topics include the identification of new teachers' needs, better induction methods, and mentoring improvements. Also discussed are comprehensive systemic teacher support, expansion of new teacher's instructional strategies, and teachers' reflections on the newcomer's needs. As an example of the material, one article explains the experiences of several Californian first-year teachers as part of their participation in the Beginning Educator's Seminars on Teaching (BEST) program. The teachers were guided by the six California Standards for the Teaching Profession, matched with experienced mentors, and given opportunities to reflect upon their teaching practices during weekly seminar meetings. They developed classroom-based research questions to help focus their attention on one specific professional development goal. (Author/JR) ENC-016671

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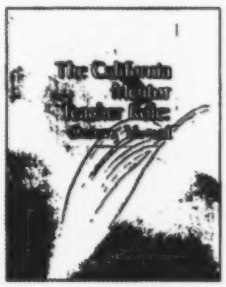
## The California Mentor Teacher Role: Owners' Manual

Grades K-12
1999
Author: Karen D. Olsen



This manual contains guidelines for assisting mentor teachers in California. Topics include the mentoring process as well as the issues that arise when working with adults. Suggestions for selecting content for discussion and communicating ideas effectively are used to highlight the differences between teaching teachers and teaching students. Additionally, the Turning Point Interaction Model (TPI) is introduced, emphasizing the need for dynamic interaction between mentors and mentees. This coaching model promotes mutual benefits, personal and professional growth, and action research. Organizational cues support the text along with a list of references for further study and criteria for evaluating district support and leadership. There is also a planning tool for carrying out the TPI program. A sample chapter discusses how to select mentors, establish bottom line goals, and fine-tune roles and responsibilities over time. Lessons learned from the California Mentor Teacher Program are addressed, and critical tasks for stakeholders are outlined. From district office to the classroom, the resource focuses on the ways in which environmental factors such as support, consistency, and flexibility impact the success or failure of mentoring programs. A worksheet offers readers a chance to perform a reality check by comparing official mentoring assignment descriptions with actual mentoring responsibilities. Reflection questions focus on who should collaborate to resolve differences in role definitions and how an agreement can be decided upon. (Author/JG) ENC-019665

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## Case Studies in Science Education

Grades K-8
1997
Author: Matthew H. Schneps, Ara Sahiner, Nancy Finkelstein, Alex Griswold, and Susan Mattson

This series of videotapes designed for teacher educators and workshop facilitators by the Harvard Smithsonian Center for Astrophysics, addresses issues and strategies in science education reform that concern science teachers in grade K-8. Each of the six videos contains case studies with footage featuring the interactions between the teacher and the students that illustrate how that teacher approaches a problem. The teachers were chosen for the case studies because they are in the process of examining their teaching methods and are representative of teachers everywhere. The teachers are shown conferring with a project advisor or strategist to develop plans which better implement reform ideas. Some of the issues discussed in the videos include dealing with diversity, increasing students' roles in their learning, and assessment. In one section, a pair of teachers use previously learned techniques to integrate math and science into cross-curricular teaching. A new idea that they try is a family science day. Their activities in the video reflect their planning, development, and evaluation of the program. The facilitator's guide contains tables that provide an overview of the series and models to help plan workshops of various lengths of time. Each case is described in the guide in terms of the teacher's setting, issue, and strategy. The teacher's professional experience and classroom are described with characteristics such as years of teaching, demographics, and hours of science taught per week. The guide contains descriptions of the lessons the teachers used (as seen on the video) and related questions for the viewers to answer. For example, workshop participants are asked to list the strengths and weaknesses of a geology activity and the problems that might occur when the teacher uses group presentations to assess individual student learning. Examples of teachers' handouts and student work are included throughout the guide. (Author/JSR) ENC-015104

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www.learner.org
$325.00 per case studies library package (includes 6 videos and 1 facilitator's guide)
$199.00 per elementary case studies package (includes tapes 1, 2, and 3 and 1 facilitator's guide)
$199/00 per middle school case studies package (includes tapes 4, 5, and 6 and 1 facilitator's guide)
$20.00 per case studies facilitator's guide

## Dennis' Dilemma: Dealing with Students' Personal Problems

Series: Mentoring the New Teacher
Grades: K-12
1991
Author: James B. Rowley, Patricia M. Hart, Eric L. Johnson, Stephen P. Gordon, and Cheryl Granade Sullivan

This resource introduces the Mentoring the New Teacher videotape series with two videos, a facilitator's guide, and two booklets that contain background information on mentoring and ways to support the new teacher. One video offers an overview of the series, and the other is the first of eight research-based case studies videos designed to promote teacher reflection and dialogue. Rather than presenting definitive answers or best strategies for resolving the issues found in the case studies, the series shows the diversity of possible solutions. Each video presents one case study in a format suitable for use with new teacher orientation, general staff development, or mentor teacher training. The case studies all begin with a dramatization of a conversation between a new teacher and a mentor in which an issue bothering the new teacher is explored. Their conversation is followed by an actual panel discussion in which experienced teachers suggest possible actions for the new teacher and examine the role of the mentor. The case study in this resource presents a second grade teacher, Dennis, who is unsure of how to handle a student's antisocial behavior and is looking to the mentor for direction. In the panel discussion, experienced teachers describe their personal experiences with abusive situations

and suggest possible courses of action. The facilitator's guide contains workshop materials for each video case study, including a one-page summary with additional insight into the new teacher's situation and a set of eight generic questions designed to help explore each issue. One of the accompanying booklets suggests resources, activities, and ideas associated with mentoring, while the other booklet describes the details of a program for assisting beginning teachers. (Author/JRS) ENC-015687

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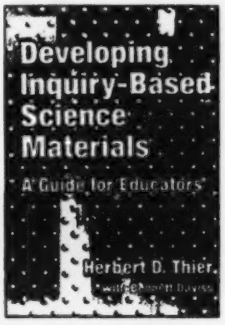
www.ascd.org
$785.00 per video set (9 videos and supplementary materials)
$115.00 per video

## Developing Inquiry-Based Science Materials: A Guide for Educators

Grades 8-12
2001
Author: Herbert D Thier and Bennett Daviss




This book, written for educators and curriculum developers, guides readers through the process of developing educational materials as well as how to organize and carry out a curriculum development project. Designed to equip developers with tools and techniques to help them meet the growing demand for inquiry-oriented materials, the book offers guidelines for obtaining external funding; information for helping teachers, administrators, and others understand the complex process of bringing new learning materials from the idea to the classroom; and a discussion of the human issues and interactions that make the materials development process work. The book begins by describing guided inquiry and providing a rationale for using inquiry in science teaching. The author discusses the constructivist basis of guided inquiry. Using SEPUP (Science Education for Public Understanding Program) as a model, the author presents three principles for designing inquiry-based science materials: emphasis on collaboration among specialists, making gradual changes (revolution through evolution), and using operational definitions that define subjects by their processes as much as by their facts and content. Subsequent chapters follow the process of materials development from locating funding sources and preparing grants to determining the roles of project team members, commercial partners, and classroom teachers. Additional chapters discuss the importance of embedded, authentic assessment, standardized tests, and program evaluation. They also provide guidelines for teacher training and for reporting to funding agencies. The book concludes with a listing of funded science education projects. A bibliography and an index are also included. (Author/LCT) ENC-019719

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## Developing Judgment: Assessing Children's Work in Mathematics

Grades: 1-5
1997
Author: Jean Moon

This book, a professional development resource for teachers of grades 1-5, aims to develop expert judgment in evaluating alternative assessment work by presenting selected examples of student work in mathematics and offering guided interpretations of that work. The author believes that teachers need to build expertise in examining student work in order to apply alternative assessment to mathematics in their classrooms. This book is organized into a series of sessions that parallel those undertaken by a project study group consisting of seven elementary school teachers and two principals. Each session deals with a major idea related to judging student work, such as: What constitutes a good classroom assessment activity? The presentation of such questions is followed by a discussion of how the issues raised by the question play out in instruction, curriculum, and assessment. Session elements include background information, goals, suggestions for conducting the session on your own, excerpts from the project study group's conversations, and the author's reflections on those conversations. A list of references is included. (Author/JRS) ENC-011846

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www.heinemann.com
$22.50 per text (paperback)

## Environmental Project (Internet)

Series: The Lesson Collection
Grades 6-8
2000
Author: producer, Marcia Darcangelo

This videotape, developed as part of The Lesson Collection series, is intended as a professional development tool for middle school science teachers. The program follows Nancy Carey's Earth science class as the students design a school web site to serve as a central collection point for information on the health of local waterways. Student teams research basic facts, habitat features, and characteristic species of local rivers and display their findings with text, scanned pictures, and graphs. With the help of a local naturalist, students also perform water quality tests of the rivers. Data from all sources, including outside agencies, are compiled into a database with spreadsheet and graphing capabilities. Throughout the activity, Carey helps students look for emerging patterns, decide what information is important, and determine the layout of web pages. The final



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phase involves a community learning stage where students analyze results and make recommendations for environmental action. (Author/JG) ENC-019334

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www.ascd.org
$95.00 per video (Ask for it under the title, The Lesson Collection)

## Exploring Science in Early Childhood: A Developmental Approach

Grades PreK-3
2000
Author: Karen K. Lind

This book, written for early childhood educators and preservice teachers, describes an approach to creating a developmentally appropriate math and science curriculum for preschool and primary school children. Emphasis is placed on using naturalistic, informal, and structured learning environments to develop concepts and foster intellectual growth. Assessment tools such as observation checklists and individual interviews are discussed, as well as methods for planning science investigations. Each chapter contains learning objectives, background information, and exploratory activities. Black and white photographs and diagrams support the text, along with a collection of developmental assessment tasks and a list of references. A sample chapter, "Applications of Fundamental Concepts in Preprimary Science," presents activities, lessons, and scenarios that focus on the skills of patterning, measuring, and graphing as they apply to experiences in preprimary children. A concept web informs readers about how these ideas can be integrated across the curriculum in the areas of language arts, mathematics, and music. Activities involve making original patterns by stringing colored macaroni, comparing size and weight of objects, and completing a color preference graph. Issues of self-regulation and the matching of expectations with skill level are also addressed. (Author/JG) ENC-019263

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www.earlychilded.delmar.com
$44.95 per book (paperback)

## Fostering Algebraic Thinking: A Guide for Teachers, Grades 6-10

Grades 6-10
1999
Author: Mark Driscoll

This professional development book aims to help grade 6-10 teachers ease their students' transition to algebra. The process defined in this book is based on the movement to center curriculum, instruction, and assessment on clearly defined standards for student learning. According to the author, three key habits of thinking that characterize the successful learning and application of algebra are the ability to understand and apply the concept of reversibility, the capacity to build rules to represent functions, and the ability to think about computation independently of particular numbers used. The book suggests strategies teachers can use to cultivate these habits of thinking along with guidelines for assessing student development. Strategies are organized around critical challenges that algebra teachers face, including how and when should students be expected to engage in symbolic representation and manipulation in algebra? Excerpts from discussions among classroom teachers help place these issues in context. Each chapter includes activities to encourage teachers to reflect on how they think about algebra and how that thinking informs their practice. There are also samples and analyses of student work to help teachers identify patterns of algebraic thinking, along with questions and strategies that can be used to guide and extend student thinking. References and suggestions for further reading are included. (Author/JRS) ENC-014533

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$22.00 per book (paperback)

## From the Ground Up: Creating a Culture of Inquiry

Grades K-8
2001
Author: editors, Heidi Mills and Amy Donnelly

This book chronicles the three-year development of the Center for Inquiry (CFI), an elementary school organized around a model of inquiry-based learning. From initial obstacles of inadequate building space and negative feedback to a greater concern for understanding and evaluating inquiry processes, the text highlights key factors to consider when facilitating institutional change. Emphasis is placed on the need for education to be a community process, requiring personal investment and vision by all parties involved. Journal excerpts, classroom examples, and copies of student work support the discussion, along with documents that outline the original proposal and interviewing procedures. Different members of the CFI team write each chapter. A sample, "It's Our School," is a product of the fifth-grade class of 2000. Student paragraphs focus on how the inquiry-based approach looks in normal, everyday activities. Experiences include involving kids in curriculum planning, fostering an appreciation for reading, and incorporating real-world applications whenever possible. The necessity of maintaining a collaborative environment of mutual trust and respect is also addressed. An epilogue responds to the growing debate over

how inquiry can be incorporated into the educational politics of standardization. (Author/JG) ENC-019474

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## The George Lucas Education Foundation

www.glef.org
Grades: K-12
2000
Author: George Lucas Educational Foundation

This web site, maintained for K-12 educators by the George Lucas Education Foundation (GLEF), offers a forum for improving teaching and learning through technology. The site is dedicated to telling the stories of the most innovative models of teaching and learning. The web site features an online version of the documentary film *Learn & Live*, hosted by Robin Williams, which profiles innovative schools across the country. Visitors can also download an electronic copy of the companion book that provides transcripts from the program and suggestions for classroom use. The site has information about GLEF projects and articles that discuss practices that enhance student learning. It offers browse lists and search features to help visitors locate information related to topics such as curriculum, community partnerships, and learning. Some articles have associated video clips. The online periodical *Edutopia* can be downloaded from the site. Grant information and links to other online educational resources and projects are provided. (Author/LCT/JR) ENC-013463

## How People Learn: Brain, Mind, Experience, and School

Grades PreK-12
2000
Author: John D. Bransford, Ann L. Brown, Rodney R. Cocking, M. Suzanne Donovan, and James W. Pellegrino

This book, developed for all educators interested in how learning takes place, is an expansion of two previous reports published by the National Research Council (NRC) on how people learn. Both original books were based on studies of the science of learning and actual practice in the classroom. This book draws on the original reports to expand on the findings, conclusions, and research agenda. The book is written in four parts: an introduction to learning theory, a discussion of particular aspects of the science of learning, how teachers can turn theory into practice, and where learning research needs to go in the future. The first two parts of the book focus on three organizing decisions: research on human learning including new developments in neuroscience, learning research that has implications for the design of formal instructional environments, and research that helps explore the possibility of helping all individuals achieve their fullest potential. Key findings featured in this section include the preconceptions of students, the need for learning facts in a conceptual framework that is organized in a way that facilitates retrieval and application, and the need to teach students to take control of their own learning. The section on teachers and teaching presents findings on the need for learner-centered schools and classrooms and the need to give attention to content, conceptual understanding, and what mastery looks like. The influence of community-centered schools is stressed, including connections to the outside world that support core-learning values. Formative assessment should be found throughout learning to provide the best opportunity for feedback to both teachers and students. Finally, the book proposes 33 different directions for future research in learning and schools. (Author/SSD) ENC-018331

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## How Students (Mis-)Understand Science and Mathematics: Intuitive Rules

Series: Ways of Knowing in Science
Grades K-12
2000
Author: Ruth Stavy and Dina Tirosh

This book presents a theory and classification of student misconceptions. The authors propose three intuitive rules that lead to misconceptions by learners, and then present a general theory of intuitive rules and discuss the implications for education. In the book, the authors make the case for a theoretical framework that explains why learners react in similar ways to unrelated situations and predict students' responses to scientific and mathematical problem-solving tasks. The book includes practical teaching strategies to address the misconceptions discussed. (Author/MM) ENC-019469

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## Implementing Standards-Based Mathematics Instruction: A Casebook for Professional Development

Series: Ways of Knowing in Science Professional Development
Grades K-12
2000
Author: Mary Kay Stein, Margaret Schwan Smith, Marjorie A. Henningsen, Edward A. Silver, and Deborah Loewenberg Ball

This book, written for teachers and teacher educators, offers insights into what makes a mathematics classroom task challenging, how classroom events influence the unfolding of tasks, and ways teachers can productively reflect on their practice. The book aims to help teachers who are trying to synthesize their current practice with the new mathematics standards. It presents the Mathematics Tasks Framework as a means to evaluate instructional decisions, the choice of materials, and learning outcomes. Six classroom case studies are developed to ground the Framework into actual classroom practice. The book is organized into two main parts. In the first, readers learn how

to use the Mathematics Tasks Framework to analyze a classroom task by rating the cognitive demand of a task; within this process, supporting research is discussed. Part two is composed of the case studies and materials for use in classes, seminars, or other instructional settings for teachers. Issues embedded in the six case studies include the role of procedures in reform mathematics, the use of manipulatives, bilingual education, and the impact of standardized testing. The case studies are based on real teachers and events, drawn from detailed documentation (videotapes and write ups) of classroom lessons and interviews with the teachers. The case studies aim to stay true to the predispositions and general teaching habits of the teacher who inspired the case. For each case study, there is a detailed analysis of the case study and questions for discussion. The authors believe that the real power of the ideas and strategies contained in the book is derived from group discussion that can grow out of reading the case studies. References are included. (Author/JRS) ENC-017977

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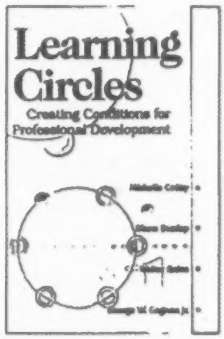
## An Introduction to Science Portfolios

www.accessexcellence.org
Series: Access Excellence
Grades 1-12
2000
Author: Joseph Mahood
Publisher: Access Excellence, at the National Health Museum

This web site, part of the Access Excellence web site and authored by a member of the Golden State Examination (GSE) Development Team, explains the philosophy behind portfolios and their implementation as a part of student assessment. It discusses how student work for the GSE science portfolio is selected from what they have produced during a year of biology, chemistry, or second year coordinated science to be representative of their depth of conceptual and procedural knowledge. The author states that portfolios encourage students to take responsibility for their own learning. The portfolio evaluators look for revision of work, personal and societal relevance, growth over time, collaboration, and connections among the various sciences as well as with other disciplines. The site contains a list of start up considerations, outlines the benefits of portfolios to students and teachers, and provides definitions and examples to help the visitors understand the portfolio system. A timeline of implementation is included. Visitors can exchange portfolio ideas on a message board and access paperwork such as self-evaluation sheets and scoring guides. The submission format for the GSE portfolios is provided. (Author/JR) ENC-016556

## Learning Circles: Creating Conditions for Professional Development

Grades: K-12
1998
Author: Michelle Collay, Diane Dunlap, Walter Enloe, and George W. Gagnon Jr.




This book presents stories, theory, and examples describing a professional development approach supporting the formation of collaborative learning groups for teachers with the goal of improving the quality of teaching and learning. The material is written for teachers of grades K-2, professional development leaders, and those involved in education or organizational change at any level. Six conditions are identified as necessary to initiating, maintaining, sustaining, and completing these communities of teacher learners or learning circles. The six key conditions involve building a community with other learners, constructing knowledge through personal experience, supporting other learners, documenting reflections on experiences, assessing expectations, and improving the culture in the classroom. In chapters exploring each condition, the authors share personal stories of how they arrived at an understanding of the condition and the role the condition plays in creating learning circles. Lastly, there are suggestions for using these six essential conditions to develop larger communities of learners beyond the framework of teacher learning circles. Suggestions include creating learning groups at the school, community, and district levels and moving classrooms toward becoming healthy communities of learners rather than collections of students. References are included. (Author/JRS) ENC-015130

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## Learning Science Through Inquiry: An Eight-Part Professional Development Workshop for K-8 Science Teachers

Series: Annenberg/CPB Professional Development Workshop
Grades K-8
2000
Author: producers, Sandra Sheppard, Suzanne Rose, and Bob Morris,

This collection of videotapes, designed for K-8 science educators, is a professional development tool that focuses on the nature of inquiry. From the initial stages of defining inquiry to the final assessment of student outcomes, each program shadows teachers in their classrooms as they demonstrate a step in the inquiry process. Roundtable discussions, immediately following the clips, involve Dr. Judith Johnson (program host and associate profes-



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sor of science education at the University of Central Florida), the featured teacher, and other experts in the educational field. These discussions center on teacher actions, attitudes, and other components of effective inquiry that often go unnoticed. Questions are posed to the audience to stimulate further reflection. Additionally, there is a guidebook that offers a framework for using the video set in a workshop format. Reading assignments, extension questions, and reproducible participant handouts are provided along with a web site that contains further information. A sample video, *What Is Inquiry and Why Do It?*, presents Virginia Lockwood's first-grade class as they investigate sharks. Students begin by writing wonderings in their work folders and sharing these ideas for peer review. Lockwood uses questioning techniques to transform these wonderings into thinks (hypotheses) and to push for further understanding. Surrounded by books, specimens, and jawbones, student teams learn about shark anatomy, habitats, and behavior. During the roundtable, the differences between inquiry and fact-finding, and between inquiry and hands-on pedagogy are discussed, underscoring the fundamental attribute of student-generated thought. The importance of establishing study groups with colleagues is also mentioned. A homework assignment asks workshop participants to maintain a daily classroom journal to identify activities that promote inquiry. (Author/JG) ENC-019930

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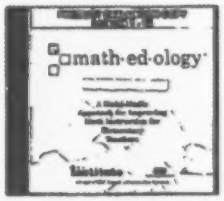
## Looking at Student Work: A Project of the Annenberg Institute for School Reform

www.lasw.org/default.htm
Grades K-12
2001
Author: Brown University, Annenberg Institute for School Reform (AISR)

This web site, hosted by the Annenberg Institute for School Reform, is a professional development resource for teachers, administrators, and staff developers who want to improve student learning through the examination of student work. Its goal is to help teachers analyze student work in order to strengthen the connections between student learning and instruction, curriculum, and other aspects of school life. The site explains the importance of protocols in which teachers collaborate as they view small samples of student work and reflect about methods of teaching and learning. These protocols are controlled group discussions, led by a facilitator, in which the participants review, describe, and discuss features of a piece of student work. The teachers who present the work are not allowed to contribute to the discussion until all of the other participants have completed their analysis. At that point, the presenting teachers can explain the context of the work and discuss what they have learned from the discussion. A virtual protocol is provided to illustrate how the protocol process takes place. Visitors can find descriptions of different protocols, definitions of protocol terms, and lists of related resources. (Author/JR) ENC-016347

## Math-ed-ology: A Multimedia Approach for Improving Mathematics Instruction for Elementary Teachers

Grades K-5
1999
Author: Arizona State University (ASU), Technology Based Learning and Research (TBLR)




This two CD-ROM set provides an in-depth look into K-5 classrooms where teachers model the application of many of the National Council of Teachers of Mathematics (NCTM) Standards as well as bilingual and ESL teaching strategies. Math-ed-ology is produced at Arizona State University. Each of the 25 lessons includes video episodes from the classroom, complete lesson plans, and expert commentary for mathematicians, math educators, and bilingual and ESL educators. A major goal is to help inservice and preservice teachers extend their ability to think critically about teaching, interpret classroom situations, and develop suggestions for improving teaching. Lessons include domino shapes and numbers for kindergarten, multiplication patterns for grades 3-5, and multiples with large numbers for grades 4-5. In a sample problem-based lesson, Patterns from Doubling, the teacher offers to pay students in a multi-grade 1-3 classroom for all the hard work they have been doing in her class. The teacher presents two pay options to the class. The first is to pay a student $5 a day for 20 days. The second is to pay a student one penny on the first day and double the amount of the previous day on each consecutive day for 20 days. The video clips show how the teacher presents and develops the lesson and how the students construct number series, do operations with large numbers, convert cents to dollars, and explore linear and exponential growth. Students, working in small groups, decide which plan seems more profitable and then determine how much the chosen plan will pay. Finally, they try to justify their decision by doing the math for both plans and comparing the totals. Student groups create math posters that show comparisons of the two plans. An important outcome of this task is that students will see and be able to state a relationship between the daily payments and the total received if the penny option is selected. (Author/JRS) ENC-018835

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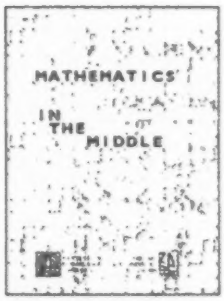
www.thejournal.com
$99.00 per CD-ROM package (2 Windows/Macintosh CD-ROMs) Price cited is per lesson per user. Package includes 25 lessons: 6 bilingual, 14 in English, 5 in Spanish. Site license available. Volume discounts

## Mathematics in the Middle

Grades 5-8
1998
Author: editor, Larry Leutzinger

This professional development book, produced by the National Council of Teachers of Mathematics (NCTM), contains articles that reflect grade 6-9 teachers' experiences as they aim to bridge the gap between elementary school and high school for students. Included are ways to facilitate student learning in thinking hypothetically, grasping cause and effect, and thinking more expansively. The effect of the NCTM's *Curriculum and Eval-*




*uation Standards* (1989) on the reality of middle school mathematics is explored. This book consists of three sections: Part One describes some important issues for middle grade students, schools, and programs, such as a chapter contrasting student-centered and content-centered classrooms. Part Two presents descriptions by the program developer for each of five middle grade standards-based curricula. This part closes with an article that traces one teacher's journey in search of a curriculum that captivates her students. Part Three presents projects, activities, and programs that are actively implementing some of the NCTM's recommendations for middle grade classrooms. Each article concludes with a list of references. (Author/JRS) ENC-014739

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National Council of Teachers of Mathematics, Inc. (NCTM), 1906 Association Drive, Reston, VA 20191
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www.nctm.org
$29.95 per book (paperback) 20% discount to NCTM members.

## Mentoring to Improve Schools

Grades 8-12
1999
Author: Todd Johnson, Tom Barnett, and Barry Sweeny

This video program and workshop facilitator's guide, intended for teachers, administrators, and community members, focus on the development and refinement of effective programs that promote mentoring and induction (the process of entering, learning, and mastering a new profession) for beginning teachers and administrators. The videotapes present interviews and video segments illustrating key components to an effective mentoring program. The facilitator's guide provides materials that clarify and expand on the ideas presented in the videos. One video shows how mentoring can improve teaching, enhance administrative practices, and create a productive teaching community. The second video discusses ways of building trust relationships, the stages in the mentoring process, and the unique challenges involved in mentoring new administrators. The seven workshops included in the facilitator's guide allow the participants to explore the mentoring and induction processes from different perspectives. The workshops integrate with segments from the videos and contain agendas, directions for the workshop facilitator, and activities. Additional notes for the facilitator are found in the margins. Reproducible sheets for handouts and transparencies as well as lists of additional resources are included in the guide. One typical workshop focuses on the relationship between the mentor and the protégé. The participants reflect on situations in their own lives where they have benefited from someone else's professional support and consider the complexity of the mentoring relationship. Video segments, overheads, or handouts provide springboards for their discussions. (Author/JR) ENC-016156

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www.ascd.org
$396.00 member's price per video package (2 videos, 1 facilitator's guide)
$466.00 nonmember's price per video package

## The Missing Link: Essential Concepts for Middle School Math Teachers

Series: Annenberg/CPB Professional Development Workshop
Grades 6-8
2000
Author: producers, Ray Lavine and Miriam Lewin

This kit, with eight videos and a workshop facilitator guidebook, is designed to help middle school teachers increase math content knowledge in four areas and expand their teaching style. The materials, part of the Annenberg/CPB Professional Development Workshop series, were developed in response to teaching and learning challenges identified by the Third International Mathematics and Science Study (TIMSS). Highlighted are ways teachers can improve instruction with hands-on problems that involve students in their own learning and demonstrate how math is used in the real world. The workshop guide contains information about presenting the videos in either a two- or four-hour workshop format. A web site with supporting material and links to online resources is also available. Each of the four content areas (proportionality, functions, angles and polygons, and sampling and probability) is featured in two videos. In the first video for each content area, a master teacher and a workshop guide lead a group of learner teachers through hands-on investigations. The viewer then sees how the teachers present the hands-on investigations in their middle school classrooms. In the second video the viewer sits in on a studio discussion as the teachers reflect on their experiences and consider new instructional and assessment techniques. For example, in the videos focusing on proportionality, the learner teachers are introduced to the concept of scale factor, use scale factor to enlarge and shrink figures, and determine how scale factor affects side lengths, angles, perimeters, and area. The master teacher explains how to develop scoring methods or rubrics for assessing student work in the scale factor investigations. The teachers, working in groups, practice using the rubrics they developed with samples of student work. Finally, the teachers work together to create new problems to deepen their students' understanding of proportionality and similar figures. (Author/JRS) ENC-019737

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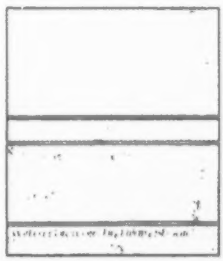
## National Center for Improving Student Learning and Achievement in Mathematics and Science

www.wcer.wisc.edu/ncisla
Grades K-12
2001
Author: National Center for Improving Student Learning and Achievement in Mathematics and Science
Publisher: University of Wisconsin, Madison

This web site, developed by researchers at the University of Wisconsin-Madison, reports on their nationally coordinated research programs to advance effective reform of K-12 mathematics and science instruction. Charged by the U.S. Department of Education in 1996 to build a solid research base about ways instruction can be improved, researchers have been working with teachers and diverse student populations to develop new mathematics and science learning environments and professional development models. Topics investigated and reported on at this site include student reasoning, mathematics and science instruction, student assessment, teacher professional development, and school features that support learning and achievement. The research is yielding classroom-based findings about effective instruction and new professional development models for sustained student learning and achievement in mathematics and science. A teacher resource section of the site supports classroom teaching with materials, such as a full 9-week curriculum using a scientific modeling-based approach for teaching middle school and high school near-Earth astronomy, evolutionary biology (natural selection), and classical genetics. (Author/JRS) ENC-019619

## Natural Learning and Mathematics

Grades: K-2
1992
Author: Rex Stoessiger and Joy Edmunds
Publisher: Heinemann and Thomas Nelson



This book, written for primary-level mathematics teachers, applies the idea of natural learning processes to the teaching of mathematics in primary schools. It is firmly based on the practical classroom experience of the authors and the teachers with whom they work. Suggestions are made about ways in which children can be challenged to explore mathematics in their own ways, to refine their thinking, to explain it orally and in writing, and to publish the best of their mathematical writing for their classmates to read and build upon. The authors urge that the study of mathematics should be approached through a variety of open-ended mathematical challenges that children can tackle in their own ways, thus drawing from their own mathematical understanding and knowledge while also exploring ideas that are new to them. The book explains these challenges and how to design them. It also offers a chapter on classroom organization and assessment. (Author/KFR) ENC-007762

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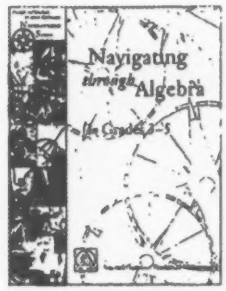
## Navigating Through Algebra in Grades 3-5

Series: Navigations
Grades 3-5
2001
Author: Gilbert J. Cuevas and Karol Yeatts




This book with CD-ROM, part of the Navigations series, is written to help teachers introduce and develop fundamental algebraic concepts with students in grades 3-5. The Navigations series, designed as a curriculum supplement, extends the National Council of Teachers of Mathematics' Principles and Standards for School Mathematics into classroom practice. The series' first four books address the Algebra Standard, with one book for each grade band (preK-2, 3-5, 6-8, and 9-12). Each book contains background information about the development of algebraic reasoning and complete lesson plans with activities to engage, explore, and extend algebraic concepts. Each lesson plan states goals for student accomplishment and suggests questions to stimulate students to think about mathematics. The accompanying CD contains grade-band-specific professional development readings and applets for interactive student exploration of the algebraic concepts. This book's lessons focus on patterns, variables and equations, and functions. In a sample lesson, students make a function machine that substitutes numbers for variables (letters). The goal is to explore the idea of a variable as a symbol that can stand for any member of a set of numbers. Students list the letters of the alphabet and numbers from 0 to 25 on two strips of paper, forming two rings. The number ring is inserted inside the letter ring matching A with 0. Students add the related numerical values to find and compare the values for their first and last names. Students experiment to find the three-letter word with the greatest value and words with values 25, 36, or 100. For assessment, students can be asked to calculate the values for their spelling words. The accompanying CD contains three applets. One applet, Encryption, allows students to create different encryption functions to encode and decode messages. (Author/JRS) ENC-019420

This series is also available for Grades PreK-2 (ENC-019419), Grades 6-8 (ENC-019415), and Grades 9-12 (ENC-019416).

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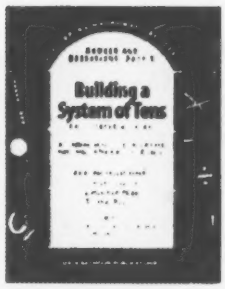
## Number and Operations, Part 1: Building a System of Tens

Series: Developing Mathematical Ideas
Grades K-6
1998
Author: Deborah Schifter, Virginia Bastable, Susan Jo Russell, Jill Bodner Lester, Linda Ruiz Davenport, Lisa Yaffee, Sophia Cohen, and David A. Smith

This professional development kit, part of the Developing Mathematical Ideas (DMI) program, contains seminar materials designed to help current and future grades K-6 teachers explore how students understand and misunderstand place value in




the base ten number system. DMI programs are field-tested seminars examining the big ideas in elementary school mathematics. Seminars are designed as stand-alone courses typically presented over a full year to teachers who meet at regularly scheduled intervals. Seminar materials include a casebook for each participant, a videotape featuring actual students in classrooms organized around student thinking, and a facilitator's guide containing detailed agendas and background reading on the issues of facilitating teacher change. The participant's book for this seminar contains 29 cases examining students' understanding of place value in the context of arithmetic operations with decimal numbers as well as whole numbers. The cases are divided into chapters that correspond to the eight sessions of the seminar. The introduction to each chapter describes the set of cases, highlights the general mathematical themes they address, and gives the reader questions to consider while reading the cases. At each session, participants discuss the cases and are involved in a related mathematics activity designed to be challenging to adult learners. In the course of the sessions, participants look at and discuss innovative curricular materials, consider research findings related to mathematics education, and create and discuss a portfolio of their assignments. References are included. (Author/JRS) ENC-018253

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$31.95 per casebook (paperback)
$31.95 per facilitator's guide (paperback)
$22.95 per video

## A Private Universe: Misconceptions That Block Learning

Series: Project STAR
Grades 9-12
1989
Author: Matthew H Schneps

This videotape presents some common student misconceptions about astronomy and demonstrates how difficult it is to address them successfully in the classroom. The program contains excerpts from the Private Universe Teacher Workshop Series that examines research on how students learn science and the implications of that research for the classroom. It opens with a segment in which newly minted Harvard graduates, dressed in caps and gowns, discuss their theories for the causes of the seasons. The Harvard grads speak eloquently about their ideas, which are, for the most part, erroneous. From there, viewers go to a 9th grade astronomy class to see how teachers can elicit student ideas about the seasons and the phases of the moon. Through interviews with high school students and teachers, and scenes of classroom activities, the program demonstrates how a student's preconceived notions and ideas can pose critical barriers to learning science. (Author/LCT) ENC-016822

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www.aspsky.org
$39.95 + $6.50 shipping & handling per video

## Private Universe Project in Mathematics: A Professional Development Workshop for K-12 Mathematics Teachers

Series: Private Universe Project in Mathematics
Grades K-12
2000
Author: producers, Matthew H. Schneps, Alex Griswold, and Tobias McElhaney

This seven-session video workshop, part of the Private Universe Project in Mathematics series, provides teachers, administrators, and other interested adults with a forum to explore issues related to teaching and learning mathematics. Each session features a 60-minute video that shows children, preK-12, and teachers engaged in mathematical problem solving. The sessions explore the belief that students develop mathematics knowledge and competence most effectively when they work on challenging problems, discuss strategies, and regularly present justifications for their solutions. The videos, taken for a university research project, document the mathematics thinking of a focus group of students as they progress from grades 1-12. The video shows the students in small-group problem-solving sessions, whole-class discussions, and individual task-based interviews. Also shown are teachers engaged in staff development, often dealing with the same mathematics questions that engaged the students. Workshop participants solve the mathematics problems presented in the videos and explore questions based on the shared experience of watching the videotapes. Key questions focus on teaching and learning mathematics, communicating mathematical ideas, and nurturing conditions that foster mathematics development. The goal is for participants to learn to recognize what is mathematical in students' activities. In a sample workshop session, proof making is explored as a central idea in mathematics. In this video, teachers in a summer professional development course and the focus group of students grapple with the same combinations problem: How many different towers four blocks high can be made with two different colored blocks? The viewer sees both the third-grade students and the teachers develop strategies and apply two kinds of proof: proof by cases and proof by induction. These proofs naturally grow out of the need to justify and convince others of the reasonableness of each group's solution. In the video, a researcher and the university professor teaching the summer course discuss how the mathematical thinking evolved and suggest ways teachers can incorporate higher-level activities into their curriculum. (Author/JRS) ENC-019292

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## Private Universe Teacher Workshops

Series: Private Universe Teacher Workshops
Grades 1-12
1995
Author: Matthew H. Schneps and Ara Sahinar

This video workshop, developed for grade 1-12 science teachers as part of the Private Universe Teacher Workshop series, examines current research on how students learn science and the implications of that research for the classroom. The nine sessions of this workshop are the edited versions of a series of interactive teleconferences broadcast in the fall of 1994. All discussions are built around footage of college graduates discussing their ideas and the question of how students assimilate scientific concepts. Workshop One, for example, asks: What causes the changing seasons? The program opens with a segment in which newly minted Harvard graduates, dressed in caps and gowns, discuss their theories for the causes of the seasons. The Harvard grads speak eloquently about their ideas, which are, for the most part, erroneous. From there, viewers go to a 9th grade astronomy class to see how teachers can elicit student ideas about the seasons. Additional themes and topics include: creating a concept map of students' ideas about photosynthesis (grade 7), exploring student understanding of an abstract concept such as What is between particles of air (grades 3, 6, 8, and 10), and investigating how a teacher can create a constructivist lesson plan about gravity and friction (grade 7). The Teacher's Guide is a print supplement to the video programs and includes a synopsis of each program, a review of the science model, and activities to be done prior to and during the workshop. (Author/LCT) ENC-012564

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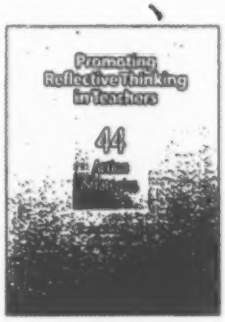
(802) 662-0881 / Fax: (802) 846-1850 / Toll Free: (800) 532-7637
www.learner.org
$39.95 per video (specify title when ordering)
$295.00 per workshop series (includes 10 videos and 1 guidebook)
$25.00 per guidebook

## Promoting Reflective Thinking in Teachers: 44 Action Strategies

Grades K-12
1998
Author: Germaine L. Taggart and Alfred P. Wilson




This book is designed to provide teacher educators and staff developers with strategies to enhance the reflective thinking abilities of preservice and inservice educators. The authors define reflective thinking as the process of making informed and logical decisions and then assessing the consequences of those decisions. They feel that reflective thinking is required for effective teaching. The book presents the field-tested strategies on three levels: technical, contextual, and dialectical. A reflective thinking pyramid diagram is used to clarify the differences between the three levels. The materials in the guide can be used in a workshop format or in courses to prepare preservice teachers for fieldwork. The book provides background information and tasks that promote reflection through journal writing, narration, and action research. For example, one task to develop observation skills related to reflective thinking has the participants develop an observation instrument, agree on classroom rules, and then observe how well their students comply with them during a 15-minute period. Handouts, black and white figures, and tables are found throughout the book. (Author/JR) ENC-015725

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www.corwinpress.com
$34.95 per book (paperback)

## Reflective Practice to Improve Schools: An Action Guide for Educators

Grades K-12
2001
Author: Jennifer York-Barr, William A. Sommers, Gail S. Ghere, and Jo Montie

This book offers educators a framework and a set of strategies for implementing reflective thinking and acting. It presents the reflective practice spiral as a guide to extend the practice of individual reflection. The reflective practice spiral has four levels at which reflection can be developed: individual, partner, small group or team, and schoolwide. It is suggested that making time for reflection at each level and moving reflective practices beyond the individual to the entire school leads to improved student learning. Essential considerations for the design and development of reflective practices at each level are identified and described. Examples of reflective practice at each of the four levels are provided. One chapter is devoted to each of the four levels in the reflective practice spiral. Suggested activities are given to aid the implementation of reflection at each level. For example, in the chapter on partner reflection, a table provides characteristics to consider when choosing a reflective practice partner and guidelines for reflecting together. This is followed by examples from actual practice of each of 11 designs for staff reflection, such as action research, cadres, coaching, portfolios, and study groups. Each chapter ends with points for reflection. (Author/JAR) ENC-019774

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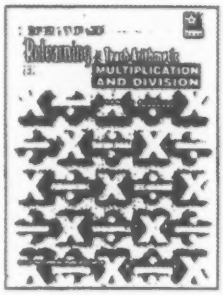
## Relearning to Teach Arithmetic: Multiplication and Division

Grades 2-5
1999
Author: Susan Jo Russell, David A. Smith, Judith Storeygard, and Megan Murray




This professional development package contains videotapes showing children's individual approaches to the operations of multiplication and division and a study guide for workshop planners. The study guide supports the facilitation of a six-session workshop where the videos serve as a basis for exploring teachers' understanding of whole number computation. The first video features students from a variety of classrooms explaining their thinking processes related to multiplication and division. While revealing primarily the mathematical work of individual students, the footage also contains images of classroom practice. These images illustrate ways teachers can support their students in working out approaches to whole number computation that are efficient, flexible, and make sense to them. The second video shows classroom interaction in a variety of situations, including primary grade students who are working with equal groups, such as twos and twenty-fives. The accompanying study guide outlines six professional development sessions during which teacher groups view segments of the video and explore the mathematics concepts that are central to understanding the four operations. Discussion topics for the workshop include the base ten number system, number relationships, the characteristics of each operation, and how the different operations are related. The study guide also contains selected readings and suggestions for further reading. There is a similar professional development package for addition and subtraction operations. (Author/JRS) ENC-018765

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Dale Seymour Publications, 4350 Equity Drive, PO Box 2649, Columbus, OH 43216
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www.pearsonlearning.com
$116.95 per video set (2 videotapes, 1 teacher's study guide)

## Science First Hand: Models in Physical Science

Series: Science First Hand
Grades 6-8
1995
Author: producers, Lynn Cadwallader, Michele Korf, and Bebe Nixon
Publisher: WGBH Educational Foundation

This collection of videotapes, developed for middle school educators, follows three public school teachers as they incorporate inquiry-based learning into their science classrooms. Emphasis is placed on group exploration, experimentation, and the acquisition of solid understanding. Throughout each program, narration guides viewers to specific aspects of inquiry, while teacher comments provide common concerns and frustrations experienced during implementation. A viewing guide provides an outline of each lesson, topics for discussion, and suggestions for assessment. A sample video, *Structures*, features Joseph Johnson's seventh grade class as the students investigate what makes a structure strong. After learning about gravity and forces, teams build houses and bridges with straws and then test them for load-bearing capacity. Taking into consideration the knowledge they have gained through field trips to local bridges, students use diagonal beams instead of horizontal ones and justify their construction decision. Other video programs involve a seventh grade class that studies rotational motion with tops and yo-yos and an eighth grade class that manipulates different variables to construct an efficient waterwheel. (Author/JG) ENC-019413

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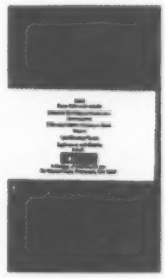
www.learner.org
$59.95 per video set (3 videos and viewer's guide)
$7.95 per additional viewer's guides

## Salad Dressing Physics: Spontaneous Generation of Metaphors

Series: Learning to See: Observing Children's Inquiry in Science
Grades K-6
1996
Author: Bernard Zubrowski and David R Nelson



This series of videotapes and print materials was designed to enhance elementary grade educators' understanding of the role of exploration in children's science learning. This project draws on Bernie Zubrowski's work observing students in science museums and classrooms, and is based on the premise that effective teachers are keen and skilled observers of children's behavior. The videos illustrate the different ways in which students begin their explorations of various phenomena, verbal and nonverbal communication during an exploration, social behavior with adults and other students, and assessment based on the way children manipulate materials and their spontaneous comments along the way. Each program is shown in real time, without narration, and features a single pair of students in order to provide teachers with an opportunity for extended, detailed observation. This session demonstrates the role of spontaneous metaphors in getting students to discuss and give their own explanations for observations and experiments. During the first 10 minutes of the video, Zubrowski gives Casey and Debra (both in grade 5) three special bottles. Each bottle is constructed by connecting two smaller bottles with a hollow tube. Each of the small bottles contains a liquid, and when the entire setup is turned over, the liquid in the top bottle sinks through the connector while the liquid in the bottom bottle floats to the top. Casey and Debra are asked to describe what they see happening with the liquids and to speculate about what the liquids might be. A Participant's Guide for each videocassette provides commentary by Zubrowski and other science educators. The Facilitator's Guide includes the project rationale, a brief description of the

nature of inquiry science teaching, suggestions for presenting the videotapes, a framework for discussing and interpreting the behavior of the children, and a brief description of each episode. (Author/LCT) ENC-004451

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Heinemann Educational Books Inc, 88 Post Road West, PO Box 5007,Westport, CT 06881
(603) 431-7894./.Fax: (203) 750-9790./.Toll-free: (800) 793-2154
www.heinemann.com
$50.00 per video package rental (session 1 & 2, participant's guide, facilitator's guide)
$110.00 per video package (sessions 1 & 2, participant's guide, facilitator's guide)
$400.00 per video package (sessions 1-4, 4 participant's guides, 1 facilitator's guide)

## Schools Around the World: An International Study of Student Academic Work

www.edc.org/cct/saw2000
Series: Council for Basic Education (CBE) Program
Grades K-12
2000
Author: Council for Basic Education, Education Development Center, Inc., Center for Children and Technology (CCT)
Publisher: Center for Children and Technology (CCT)

This web site is the home page of Schools Around the World (SAW), a professional development program designed by the Council for Basic Education (CBE), an education interest group that advocates high academic performance for all students. The site gives an overview of the project and provides information on participating nations, online courses run by SAW, and ways to participate in the program. The SAW program grew out of the need to understand what constitutes world-class standards and works by giving teachers in each of the participating nations and regions the opportunity to examine and reflect upon their teaching practice via the analysis of student work. Teachers collect student work on topics that are taught in nations that rated highly on the Third International Mathematics and Science Study. SAW offers a hands-on assessment tool designed to help improve student achievement. The SAW model uses CD-ROMs, online courses, and Internet resources to exhibit the work samples. Once teachers have completed an orientation process, they can access any part of the model. Online courses allow participants to analyze student work from the nine SAW partner nations and participate in online discussions. There is also a page outlining the criteria for considering a piece of student work for inclusion in the database. (Author/MM) ENC-019233

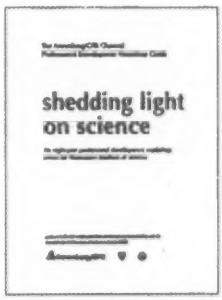
## Science Inquiry Model

www.nwrel.org/msec/science_inq/index.html
Grades K-12
2000
Author: Northwest Regional Educational Laboratory, Mathematics and Science Education Center

This web site, maintained by the Mathematics and Science Education Center (MSEC) as part of the Northwest Regional Educational Laboratory (NWREL), is designed to assist K-12 teachers in infusing inquiry into science instruction and curriculum. On-screen categories guide users to information on the nature of science inquiry, components of the NWREL inquiry model, and teaching strategies to prompt scientific thinking. Sample classroom tasks and scoring guides are available and can be downloaded using AcrobatReader. The Resources category provides descriptions of web-based publications and videos produced by MSEC as well as links to their lending library system that allows free borrowing of materials by teachers from the Northwestern United States. One of the feature resources, entitled, "It's Just Good Teaching," includes a series of booklets and videos on topics ranging from science and math standards to integrating technology into the classroom. Additionally, a review of research literature is available. Users can also access the NWREL homepage where they can connect to over 15,000 different educational resources, read about current topics in education, and learn about available local, state, and national education programs and services. (Author/JG) ENC-018820

## Shedding Light on Science: A Professional Development Workshop Series for Elementary Teachers of Science

Grades K-5
1999
Author: Ara Sabiner, Nancy Finkelstein, Sandra K. Abell, Lawrence B. Flick, Anita Greenwood, and Camille L. Wainwright




This collection of eight workshop videotapes, developed for elementary science teachers, uses the topic of light to promote the understanding of physical, chemical, and Earth science concepts. The primary intent of the program is to educate teachers about the science content knowledge needed to design inquiry-based lessons. Topics for study include the properties of light, how the eye perceives color, and the role of light in wind and weather. On-screen cues refer viewers to Internet web sites and links for further information. A supplemental print guide is provided that consists of activities to perform before and after viewing the video programs. Preliminary activities uncover workshop participants' prior knowledge and clarify misconceptions while concluding activities and homework assignments reinforce learned topics. Each video contains a history of science segment, demonstrations, and schematic diagrams to illustrate the nature of light. One video displays Isaac Newton's early light experiments and presents the concepts of absorption and reflection of light through the use of gelatin filters. Classroom clips are also provided. A sample classroom lesson investigates how a color television works. Students use magnifying glasses to view different images on a television screen and conclude that all perceived color is a combination of the three primary colors of light. (Author/JG) ENC-018798

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$199.00 per video set (8 videotapes and 1 guide)

## STREAM (Secondary Training and Reform Effort Using Alternative Materials)

Grades 9-12
1999
Author: Solomon Garfunkel

This set of videos with viewing guide is designed to engage viewers in discussion and action about secondary mathematics education reform in grades 9-12. The videos contain classroom segments that show the similarities found in the five secondary reform curricula funded by the National Science Foundation (NSF). The first video provides an overview of the STREAM project and poses core questions that have been part of the dialogue about reform changes in the mathematics classroom. In most cases, the video content does not try to answer questions, but rather records the thoughts and impressions of teachers, students, and parents related to mathematics education reform. Each of the remaining five videos highlights one of the NSF-funded curricula. The viewer guide contains background information for the facilitator, handout materials, and suggestions for using the videos to spark discussion along with reproducible excerpts from each of the five curriculum texts that may be used as activities with viewers. For example, in video four, the viewer sees how the Interactive Mathematics Program is being taught in three different classroom situations. The mathematics topics covered in these classes include similar triangles, data analysis, and local linearity. In one class, students are seen working with a unit titled The Pit and the Pendulum. This unit uses the title story as a way to introduce students to normal distribution and standard deviation, along with learning about quadratic equations and curve fitting. (Author/JRS) ENC-019361

Ordering information
Consortium for Mathematics and Its Applications (COMAP), Suite 210, 57 Bedford Street, Lexington, MA 02173
Fax: (617) 863-1202 / Toll-free: (800) 772-6627
www.comap.com
$250.00 per video set (6 videotapes; 1 guide)

## Structured Exploration: New Perspectives on Mathematics Professional Development

Grades K-8
1997
Author: Grace Kelemanik, Susan Janssen, Barbara Miller, and Kristi Ransick

This booklet describes a professional development process called structured exploration in which teachers do mathematics investigations together and analyze student work from the same investigations. The goal of the process is to deepen teachers' understanding of mathematics concepts and increase their capacity to focus on student thinking. The text outlines steps in the process focusing on three elements: use of inquiry, cross grade groups, and open-ended investigations. In the structured exploration process, teachers act as researchers and are encouraged to ask questions such as, How was the student thinking?, rather then simply asking, Did the student master the skill I wanted him or her to learn? The booklet contains problems used in structured explorations along with samples of teacher and student work on the problems. The material concludes with a vignette describing actual teachers exploring an open-ended question using the structured exploration process. A bibliography is included. (Author/JRS) ENC-017364 Ordering information

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$29.95 + $3.95 shipping & handling per book (spiral-bound, paperback) Bulk order discounts also available.

## Student Watershed Research Project

www.swrp.org
Grades 8-12
2000
Author: Stacy Benfro and Torrey Lindbo

This web site, maintained by the Saturday Academy at the Oregon Graduate Institute of Science and Technology, provides information about the Student Watershed Research Project (SWRP). SWRP uses the cooperation of teachers, students, and scientists as well as businesses, governmental agencies, and community groups to couple watershed education with the collection of high-quality data. The project is fundamentally based on water quality research and watershed health analysis. As citizen scientists, students learn to gather and use scientific information in community decision making. The web site aims to help students gain an increased awareness of the complex issues involved in environmental stewardship. Teachers and students participating in SWRP's local monitoring program may enter watershed data for auditing and reporting by logging on to the web site. The web site contains publications of the SWRP as well as student presentations from the SWRP's Eighth Annual Student Watershed Summit. The web site provides information about technical training workshops offered by the SWRP. Watershed resources and detailed information about the project's sampling sites are also included. (Author/FCM) ENC-019682

## Teaching About Science: Understanding the Nature of Science

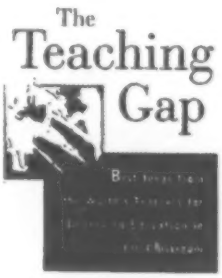
www.nuffieldfoundation.org/aboutscience/index.shtml
Grades 11-12
2001
Author: University of Leeds
Publisher: Nuffield Foundation

This web site, maintained by the Nuffield Foundation, is intended to help teachers of upper-level grades in high school explore the nature of science with their students. The six lessons on the site were developed by a project team at the University of Leeds. The lessons cover three aspects of the nature of science: the nature of theoretical explanations in science, assessing the quality of scientific data, and the purposes of scientific investigations. Lesson topics include the purposes of scientific research, continental drift, and chemical data. Each lesson is accompanied by Notes for Teachers, student worksheets, and other resources that can be downloaded. The web site also pro-

vides information about common misconceptions that students have about the nature of scientific theories and scientific data. In addition, the site explains how giving students an understanding of the nature of science may help them better learn concepts in science, and emphasizes the importance of a scientifically literate citizenry. (Author/FCM) ENC-019304

### The Teaching Gap: Best Ideas from the World's Teachers for Improving Education in the Classroom

Grades 8-12
1999
Author: James W. Stigler and James Hiebert
Publisher: The Free Press




This book, for adult stakeholders in educational improvement, describes the differences in teaching practices between the United States, Japan, and Germany that have been seen in the videotaped lessons as part of Third International Mathematics and Science Study (TIMSS). The authors explain that, by looking at the cultural differences between classroom practices in the three countries, one can see the causes of the international gaps in student performance. The analysis of the videotapes clarifies the differences in the relationships among students, teachers, and the content being studied. The book presents scenarios, tables, and graphs to illustrate these relationships. According to the authors, even while the United States educational system enacts reform, the system does not improve. Because of the international discrepancies shown in TIMSS and the lack of effective educational improvements, they call for a mechanism of change in the form of a continuous process of professional development. One of the most common components of continuous professional development that has been successful in Japan is lesson study. In lesson study, groups of teachers meet regularly over long periods of time to work on the design, implementation, testing, and improvement of one or several research lessons. Based on these lesson study methods of Japanese professional development, the authors provide principles for improvement and initiatives for change in the United States. (Author/JR) ENC-016599

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$23.00 per book (hardcover)

### Teaching High School Science

Grades 9-12
2000
Author: producers, Michele Korf, Robert Roche, Kathy White, and Susan Bellows

This collection of videotapes is intended for use as a professional development tool for high school science educators. Throughout the set of programs, viewers watch how teachers in the life, physical, and space science disciplines use inquiry-based instruction in their classrooms. Topics for study include chemical reactions, the behavior of crickets, and the Mars landscape. A sample video, *The Physics of Optics*, follows physics teacher Arthur Eisenkraft as he guides his students in understanding the nature of lenses and the relationships they have to mirrors. During the three-day sequence of footage, students form different sized images using a lens and screen, analyze their object and image data using graphing techniques, and design an eye based on their acquired knowledge. Reference to real-world applications and algebraic proofs are used to support the learning process along with group presentations and critical thinking problems. A supplementary guidebook is provided that covers the contents of each video, the locations of the lessons in the curriculum sequence, and instructions for performing the hands-on activities presented. Additionally, there are pre- and post-viewing suggestions, lists of key vocabulary terms, and Science Refresher pages that review science content. Author/JG) ENC-019765

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(802) 862-8881 / Fax: (802) 846-1850 / Toll-free: (800) 532-7637
www.learner.org
$275.00 per video set (6 videos with 1 guidebook) Series sales only, no individual tapes sold.
$25.00 per guidebook (spiral-bound)

### Teaching Math: A Video Library

Series: Teaching Math (Annenberg/CPB Math and Science Project)
Grades: 9-12
1996
Author: Lynn Cadwall, Michele Korf, Karen Jorsild, Henry S. Kepner Jr., Carol E. Malloy, and Ruth Tsu

This video library was designed for preservice and inservice workshops, individual teachers, parent-teacher association meetings, and school administrators. The library began when the Annenburg/CPB Math and Science Project issued a call for visual examples of dynamic high school teaching that illustrate the curriculum content and process areas outlined in the National Council of Teachers of Mathematics (NCTM) Curriculum and Evaluation Standards for School Mathematics (1989). The collection of 10 tapes includes an introductory video, five tapes containing real, unscripted lessons focusing on different content areas, and four videos that focus on communication, reasoning, connections, and problem solving by showing excerpts from the lessons. The videos provide viewers with an opportunity to observe a wide range of teacher-created lessons from various curricula in diverse educational settings. Different lessons include applications to real-life situations, technology use, and problems with more than one correct solution. In one content area video, for example, a teacher from a Boston high school conducts a small group activity with ninth graders. Groups of students try to find a pattern that tells how many blocks are needed to make different-sized staircases. Each group uses paper squares to build several staircase models, records their data on a large piece of paper, and writes down

questions that they encounter. The teacher moves from group to group asking and answering questions. Each video ends with analysis questions intended to spark discussion and reflection. In the staircase activity, for example, one question asks how the teacher's questions encouraged reasoning. Selected videos include interviews that give students' reactions to the classroom activities. Also included with the video is a guidebook comprised of individual units accompanying each video. Each unit contains a list of NCTM standards featured in the lesson, a summary of the video, and an exploration activity, as well as information about the classroom and a list of discussion ideas. (Author/KFR) ENC-009487

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$250.00 per complete video library (10 videos, 1 guidebook)

## Teaching Workshop 1: Elementary Science

Series: Teaching for Results
Grades K-8
2000
Author: producers, Helen Coltrinari, and John Labow

Developed for elementary science teachers as part of the Teaching for Results series, this video workshop is designed to strengthen teacher skills and demonstrate how instructional television can be integrated into the curriculum. Presenting the material in the format of a newscast, anchors Sandi Stahlbrand and Ellen Bear introduce video clips of educators as they demonstrate best practices in education, model effective assessment strategies, and offer innovative ideas for reaching classroom objectives. Dr. Roberta Bondar, a Canadian astronaut, and Mozelle Lang, from the Michigan Department of Education, provide their expert opinions on educational reform and the need for science instruction to be inquiry based. Discrepant events, manipulatives, and field trips are highlighted as keys to student motivation. One section of the video contains methods for incorporating video programs effectively within a lesson. These methods involve providing a focus for viewing, assigning specific tasks during the presentation, and reinforcing concepts with hands-on investigations. A sample video clip includes footage of different types of animals with their eggs. Students are asked to list, as the program is playing, all of the animals they observe that produce eggs. A follow-up exploration requires placing books on top of an egg foundation to determine shell strength. Other topics discussed include the critical nature of linking concepts with global applications and matching teaching strategies with assessment. (Author/JG) ENC-019375

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Chip Taylor Communications, 2 East View Drive, Derry, NH 03038
(603) 434-9262 / Fax: (603) 432-2723 / Toll-free: (800) 876-2447
www.chiptaylor.com
$266.65 per video. Educator discounts available.

## Teaching Workshop 2: Elementary Math

Series: Teaching for Results
Grades K-8
2000
Author: producers, Helen Coltrinari and John Labow

This videotape, part of the Teaching for Results series, explores strategies elementary teachers can use to make mathematics relevant to students' day-to-day lives. The series features a professional development workshop format designed to strengthen teacher skills and demonstrate how instructional television can be integrated into the curriculum. Suggested strategies for incorporating video programs effectively within a lesson involve providing a focus for viewing, assigning specific tasks during the presentation, and reinforcing concepts with hands-on investigations. This videotape uses a newscast format with anchors Sandi Stahlbrand and Ellen Bear introducing video clips that demonstrate classroom best practices for teaching mathematics. Teacher viewers are encouraged to make math fun, and to have students think and communicate mathematically. The video contains an interview with Mike Allen, designer of the retractable roof of the Toronto SkyDome, who stresses the usefulness and importance of high school mathematics. Strategies for teaching students how to problem solve are introduced. Students are seen using estimation techniques, exploring patterns, and tessellations. The video closes with the anchors answering questions from teachers about classroom implementation of these best practices. (Author/JRS) ENC-019861

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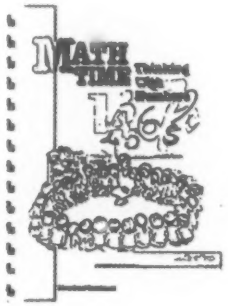
Chip Taylor Communications, 2 East View Drive, Derry, NH 03038
(603) 434-9262 / Fax: (603) 432-2723 / Toll-free: (800) 876-2447
www.chiptaylor.com
$266.65 per video. Educator discounts available.

## Thinking with Numbers

Series: Math Time
Grades: K-2
1994
Author: Kathy Richardson, Karen Antell, and Linda Starr



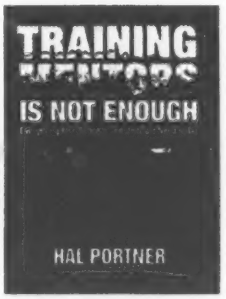

This professional development video kit shows children in K-2 classrooms using a variety of computation strategies and Unifix cubes to solve arithmetic problems in ways that make sense to them. The two videos feature classroom teachers using a teaching approach called Number Talks. The goal of this technique is to foster children's understanding of number concepts by engaging them not only in solving problems but also in discussing their strategies. Video One focuses on addition and subtraction algorithms with carrying and borrowing. It shows the difficulties children often have when asked to solve arithmetic problems using procedures they don't understand. The videotape is structured so that viewers have the opportunity to

mentally calculate the answers and discuss their own strategies before observing how the children solve the problems. To show how the children progress in their mathematical thinking, there is footage of two of the children one year later solving more difficult problems. Video Two analyzes the various methods children use to solve arithmetic problems. Ideas are given on classroom approaches to support children's mathematical thinking. Included in this video is a complete Number Talk presentation from beginning to end showing children's problem solving strategies and teacher interactions in an actual classroom situation. The video set also contains a guide with background information for the discussion leader of a teacher group and a handout section designed to help teachers begin their own Number Talks. (Author/JRS) ENC-013914

Ordering Information
Educational Enrichment Inc, PO Box 1628,Blanchard, OK 73010
Fax: (800) 292-6022 / Toll-free: (800) 292-6022
$155.00 per video set

## Training Mentors Is Not Enough

Grades K-12
2001
Author: Hal Portner




This book contains guidelines for establishing and enhancing teacher mentoring programs. Written in a conversational format, the text compares adequate and exemplary mentoring programs and explains the impact of The Law of Unanticipated Consequences (LUC). Components such as committed participants, support from the macrosystem, and effective professional development are cited as fundamental to effective mentoring. Each chapter contains multiple examples of school situations that have both supported and hindered the process of assisting new teachers. There are also exercises that help readers reflect on their personal beliefs and focus on strategies to plan and implement an exemplary mentoring program. A sample chapter, The Macrosystem, highlights the role that state mandates, guidelines, and incentives play in shaping certain aspects of mentoring programs. The nature of legislation is addressed as well as the issue that most policies regulate what should be done rather than how it should be done. The author suggests that knowing how to proceed should not be a solitary endeavor. Institutions of higher education and professional associations have the resources to offer a wealth of knowledge and expertise. A district must also utilize individuals from within the culture. Exercises require participants to organize whom to contact in the State Department of Education and the methods for justifying funding, as well as how to get local universities involved in the process. (Author/JG) ENC-019646

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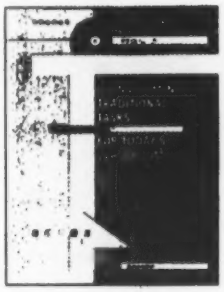
## Transforming Traditional Tasks for Today's Classroom

Grades 7-8
2000
Author: Barbara Wilmot



This book, written for grade 7 and 8 mathematics teachers, is designed as a guide to turning typical textbook exercises into more open tasks. It contains sixteen traditional exercises, each with a corresponding task that is a more open, complex alternative derived from the traditional one. The text explains why and how the transformations are made. Sample student responses are included, along with detailed suggestions for interpreting and assessing those responses. Among the topics addressed in the activities are arithmetic, probability, and geometry. A general discussion of assessment and rubrics is included in the appendix. As an example, in the activity Proportion Patterns, the traditional task is to solve for x in $50/100 = 100/x$. The aim of the new task is to provide only partial data and allow students to create their own proportions and complete them in multiple ways. In a typical question from the new activity sheet, students are told that three numbers of a proportion are 50, 100, and 200. They are asked to find at least two other numbers to complete a proportion. Then they must tell how they found the other numbers or describe any patterns they saw. A sample student response is presented and analyzed. (Author/MM) ENC-019401

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## What's Happening in Math Class? Volumes 1 and 2

Series on School Reform
Grades 1-12
1996
Author: Deborah Schifter

This two-volume collection of essays, written by teacher educators and teachers of grades 1-12, is intended for use by preservice and inservice teacher groups interested in practitioner-based inquiry. Teachers participating in the Mathematics Process Writing Project (MPWP), conducted by SummerMath for Teachers, produced detailed, reflective, first-person narratives exploring their own classroom processes, instructional goals, and decision making, as well as their own changing professional identities in light of the goals of constructivist reform efforts. The chapters in each volume are organized by theme and are composed of two or three teacher narratives, followed by an essay by a teacher educator that attempts to reveal some of the broader issues in mathematics education that are embedded in the narratives. Topics such as the implications of constructivism, concerns about mathematics content, and strategies for preparing students for a new classroom culture are all covered in these essays. Volume 1, *Envisioning New Prac-*

*tices Through Teacher Narratives*, contains essays that address both grade-specific mathematical content as well as issues that classroom teachers are likely to face as they engage in the new mathematics pedagogy. For instance, teaching students to work collaboratively and engaging students in mathematical inquiry are both explored in this text. Volume 2, *Reconstructing Professional Identities*, contains essays that explore pedagogical issues such as redefining responsibilities for student learning, monitoring student progress, learning to listen for the sense in students' mathematical constructions, and creating contexts for addressing issues that arise from instruction. (Author/CMS) ENC-009073

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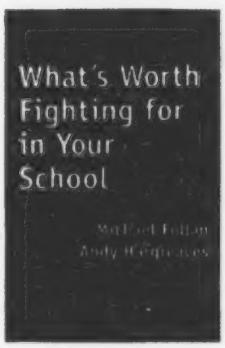
## What's Worth Fighting for in Your School?

Series: What's Worth Fighting For?
Grades K-12
1996
Author: Michael G. Fullan and Andy Hargreaves




This professional development book, part of the What's Worth Fighting For? trilogy, examines the need for individual responsibility and a collaborative culture in schools and provides guidelines and encouragement for teachers and principals working for school reform. The trilogy aims to promote action for change while addressing the complexity of the current education environment with insight and practicality. The book addresses issues with which all faculties must contend in their efforts to change schools. Issues include: How can teachers build an authentic collaborative culture with collegiality as opposed to congeniality? How can teachers become leaders? How can professional development be intrinsic to the work of improving the school? And, perhaps most importantly, How can teachers work for improvement and still have time for their personal lives? After developing the issues, separate guidelines for teachers, principals, and school systems are presented that focus on the challenge of continuous school improvement leading to gains in student achievement. The guidelines are developed within a framework of considering teachers in holistic terms as people experiencing 35- or 40-year careers, schools in terms of the social and working conditions of teachers and principals, and teaching as both a caring and an intellectual profession. Teacher guidelines promote the development of an interactive professionalism in schools where teachers have greater discretion in making decisions with and on behalf of the children they know best, where they make decisions in a collaborative culture of help and support, and where they are more fundamentally accountable as they engage in dialogue, action, and assessment of their work with other adults inside and outside their schools. A bibliography is included. (Author/JRS) ENC-013410

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## Whole-Faculty Study Groups: Creating Student-Based Professional Development

Grades K-12
2000
Author: Carlene U. Murphy and Dale W. Lick

This book, written for K-12 teachers, administrators, and staff, describes whole-faculty study groups (WFSGs) as an approach to staff development. In this approach, all teachers on a faculty are actively involved in study groups to address student needs. This book can be used as a textbook, a detailed reference book, or a stand-alone guide for the effective initiation, implementation, and completion of the WFSG approach to staff development and major improvements in schools. Divided into nine chapters, the book begins with a discussion of the school reform environment and the potential of the WFSG approach to improve schools and student learning in addition to enhancing schools as learning organizations. Chapter 2 describes the concept and nature of faculty study groups and their functions for faculty development, identification of schoolwide needs, and implementation of curricular and instructional innovations. Study groups may also conduct research on teaching and learning and become involved in the assessment of innovations on students and the workplace. Subsequent chapters describe how to organize WFSG and detail what teachers can study or investigate in terms of staff development, content knowledge, instructional skills, and classroom management. Additional topics include sustaining and improving study groups and team-building skills. The final chapter provides examples of the accomplishments of successful WFSG programs. The appendices contain practical information for the application of WFSG, including examples of study group action plans, a set of study group logs, and artifacts from WFSG schools. A bibliography and an index are also included. (Author/LCT) ENC-019679

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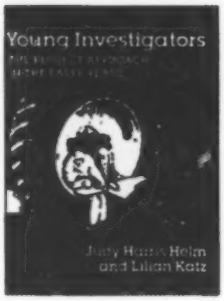
## Young Investigators: The Project Approach in the Early Years

Series: Early Childhood Education
Grades PreK-1
2001
Author: Judy Harris Helm and Lilian G Katz

This book, developed as part of the Early Childhood Education series, discusses the nature of project learning and how this pedagogical approach can be implemented in preschool and primary grade classrooms. Differences between teacher-planned experiences and project methods are highlighted, along with the academic and social benefits of project work. Additional




information includes suggestions for getting started, investigating, and culminating the process, as well as methodologies for maintaining curricular standards and utilizing technology. A sample chapter, "Investigation," addresses the need for organized fieldwork. Logistical concerns such as proper materials, informed chaperones, and appropriate schedules are considered, along with the more critical issues of balancing directions with spontaneity. Activities such as doing observational sketching, developing questions, and writing results are presented and illustrated through photographs, examples of student work, and classroom accounts. Flowcharts and tables are included in this chapter, and throughout the text, to assist in developing and monitoring learning outcomes. A teacher's project planning journal is also provided. (Author/JG) ENC-019286

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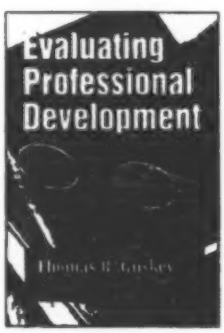
## Measure results... Evaluation resources

### Evaluating Professional Development

Grades K-12
2000
Author: Thomas R. Guskey




This book offers educators guidance about how to ask evaluation questions and gather precise information about what contributes to effective professional development programs. It emphasizes the importance of concentrating on both the participants' reactions to the programs and the impact that the professional development has on student learning. It considers the usefulness of all levels of the professional development process, from planning and implementation to follow-up and institutionalization. At each level, the book discusses the central questions that should be addressed, the pertinent information that needs to be gathered, and how best to present that information to various audiences. It also considers suggestions, procedures, and instruments that school and district leaders can use to modify their professional development efforts and assess the impact of various programs and activities. Each chapter in the book is organized around a series of critical questions related to program evaluation and ends with a set of reflection questions. Author's notes, which include vignettes, quotes, and research-based considerations, are highlighted in boxes and are scattered throughout the text. Tables, figures, and sample documents are found throughout the book. (Author/ JR) ENC-017541

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### What Works in the Middle: Results-Based Staff Development

Grades 5-8
1999
Author: Joellen P. Killion

This book, developed for grades 5-8, is a compilation of the results of 26 staff development programs in the core content areas. The guide identifies the common characteristics of the programs and gives descriptions of programs currently in use. The information and resources provided allow for selection, design, and evaluation of staff development programs to improve student achievement and meet content area standards. Descriptions are provided of programs in such content areas as mathematics, science, and language arts. The criteria for a program to be included in this resource were that results could be measured in terms of student performance, that the program was well defined and used at multiple schools, and that the program was designed to increase teachers' content knowledge or content-specific pedagogical skills. Each program description includes the context in which the program was successfully implemented, the design of the staff development program, and a summary of results, including the sources of evidence used to measure student achievement. Contact information is also provided for each program. The last part of the book is designed to help a school choose or develop its own programs. It starts by identifying the common characteristics of the 26 programs featured. Questions and a worksheet are provided to help guide a school in making the decisions necessary for selecting a staff development approach. Finally, some of the steps necessary to move forward with a staff development program are outlined. The book contains an extensive list of references. (Author/SSD) ENC-018423

Also available online. Search the ERIC web site under ENC-019681.

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National Staff Development Council (NSDC), PO Box 240, Oxford, OH 45056
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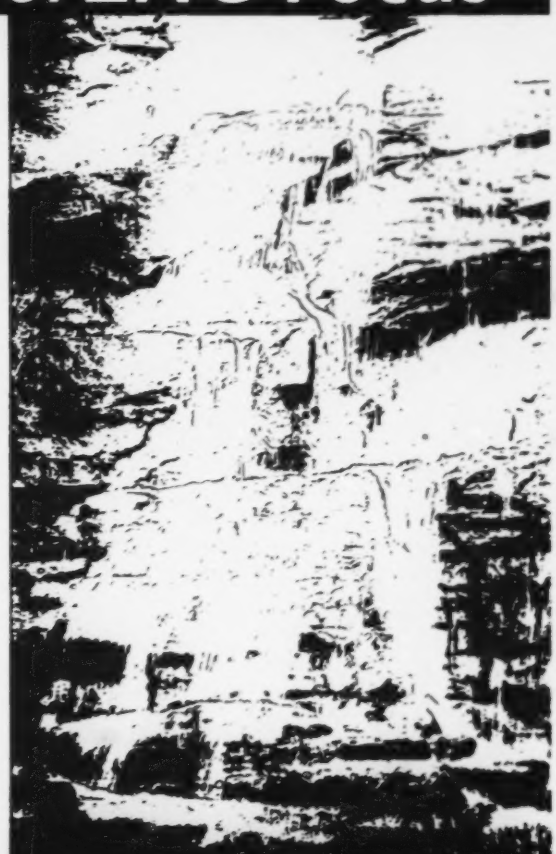

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